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AN OPERATION FOR GLAUCOMA.

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The operation here described provides for permanent subconjunctival drainage of the anterior chamber by means of a twisted gold wire loop inserted at the angle thru a keratome incision made after lifting a conjunctival flap as for trephining. Twenty-five cases (32 eyes) operated on in 1916 to 1920, inclusive, are reported. The results were failures, 10 percent; partial failures, 12 percent; successes, 78 percent.

Numerous operations have already been devised for the relief of increased intraocular tension, and many surgeons, who have adopted these operations, have published their results from time to time, but judging by their reports, it is obvious that perfection has not yet been attained in the surgical treatment of glaucoma.

It is not the purpose of this paper to discuss the merits, or the demerits of those operations. That has already been done in the medical press quite fully, by those whose opinion and good judgment cannot be questioned. Those, however, who meet with disappointing results, naturally feel keenly the necessity of improving, if possible, on the good work already accomplished, or to try some new method in the hope that some measure of success will attend their labors.

The operations now most extensively practiced are those which aim at establishing a communication between the anterior chamber of the eye and the subconjunctival space. There seems to be a unanimity among ophthalmic surgeons that draining the anterior chamber into the subconjunctival tissue is the underlying principle which offers best prospects of cure or improvement in glaucoma simplex. How this is to be done successfully, in all cases, is the perplexing question which the ophthalmic surgeon must endeavor to solve.

In utilizing the above stated principle different methods are employed, and with gratifying success in many cases; while others, and they are not so few, terminate in dismal failure; either thru cessation of the filtration process with increase in tension, or from too free an outlet for the aqueous, resulting in subnormal tension of the eye with gradual degeneration of the intraocular structures. The operation, therefore, which would hold out greatest promise of success, appears to be one that establishes a permanent communication between the anterior chamber and the subconjunctival space; and permits the escape of the aqueous into the lymphatics of the subconjunctival tissue in such quantities as would keep the tension of the eye within normal limits, provided, of course, that the operation is not contraindicated on some other grounds. Not only should this principle of draining the anterior chamber be kept in mind, but the operation should be simple in technic, and free from undue traumatism on the diseased eye. For let us not forget that a glaucomatous eye, altho it shows no signs of active inflammation, is nevertheless a diseased organ and does not always respond well to surgical interference. The ideal operation, therefore, would be one which creates a permanent outlet for the pent up intraocular fluids and causes least traumatism, little or no unfavorable after effects, is easy to execute and keeps the tension of the eye within physiologic limits.

As stated before, numerous operations have already been devised to attain this object and some of them have their strong advocates, but disappointments still run high in many quarters. Every failure cannot be attributed entirely to a faulty operation. Without a doubt, altho it may be unkind to say it, some failures are due to shortcom-

ings of the surgeons themselves. The fact remains, however, that no operation *per se* has yet been universally accepted, as the last and final word in the surgical treatment of glaucoma. There is still room for improvement.

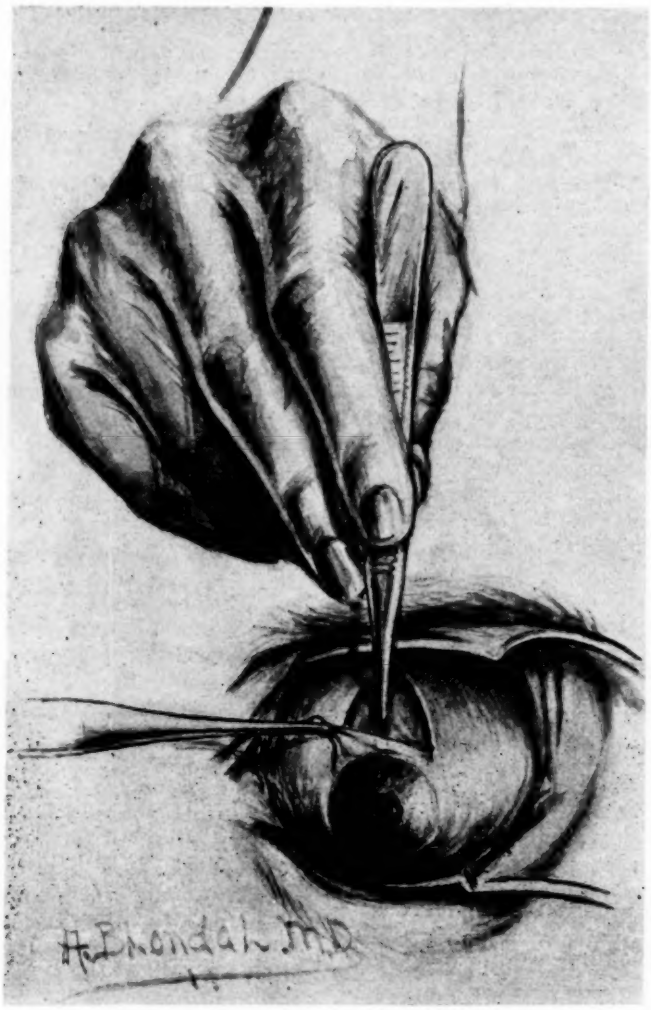

Fig. 1. Placing insert in position. Size of insert is here introduced farther into the anterior chamber than usually for purposes of demonstration.

In 1912 Mayou and Zorab reported independently in the Ophthalmoscope (May, 1912, Vol. X, No. 5) a few cases where they had used silk thread to drain the anterior chamber into the subconjunctival tissue. Both claimed satisfactory results. In 1913 Zorab reported again in the Ophthalmoscope, for April of that year, 16 more cases, operated on by that method. His second communication was not so encouraging as the first. He reported one case where an eye was lost from panophthalmitis, showing that the silk thread entails considerable risk of infection.

After careful study of the points in view, it occurred to me that the anterior chamber could be drained with reasonable safety into the subconjunctival tissue by means of a fine gold wire, if proper antiseptic precautions

were taken. I finally decided to try it and on December 1st, 1916, my first operation was performed. The patient was a woman 60 years of age, blind in the right eye for a year from chronic glaucoma. Five days before she came to me she developed an acute attack in the blind eye, with violent pain and vomiting. She had been kept on large doses of morphin by the local physician for three days before she arrived, on account of her sufferings. When I first saw her she had profound chemosis, cornea steamy, pupil dilated, anterior chamber rather deep, tension, 80 mm. with Schiötz's tonometer.

The clinical picture was far from encouraging, and, in fact, strongly suggested enucleation of the eye. The patient, however, was very anxious that the eye be saved if possible. She was given the usual medical treatment, but without the slightest reduction in tension, or amelioration of symptoms. As surgical measures were obviously unavoidable, it occurred to me that this would be a good case on which to try the operation that I had had in mind for some time. After explaining the nature of the operation to the patient, she at once gave her consent to have it tried.

Under general anesthesia the operation was performed. A gold wire loop, (Fig. 3, No. 1) was placed in the anterior chamber beneath a conjunctival flap to permit the aqueous to escape into the subconjunctival space. The results were so striking, and the patient made such excellent recovery that I felt justified in giving this method a further trial.

My method then, of establishing a permanent communication between the anterior chamber and the subconjunctival space for reducing intraocular tension, is briefly as follows:

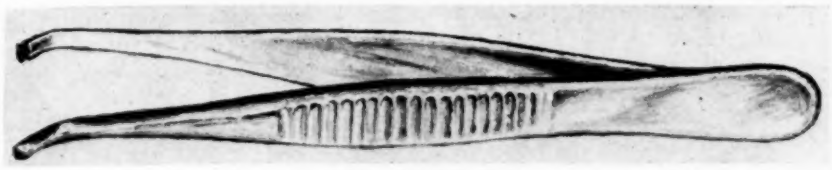

Fig. 2. Introducer.

A 22 carat gold wire, 1/5 mm. in thickness is used for that purpose. A piece of this wire 18 mm. long is taken and bent together in the center. About 3½ mm. from the apex each arm is bent at a right angle in the same plane. Both ends of the wire are then bent together in the same plane as before so as to form a base with a perpendicular, the ends of the wire meeting at the middle of the base, where they should be carefully fused. Otherwise they might penetrate the conjunctival flap and irritate the eyelid. The perpendicular part is then twisted loosely in the form of a spiral. The wire now fashioned in the shape of a T has a perpendicular of about 3 mm., with a base of 4 mm., in length. The base of the wire is bent slightly to conform to the curvature of the globe.

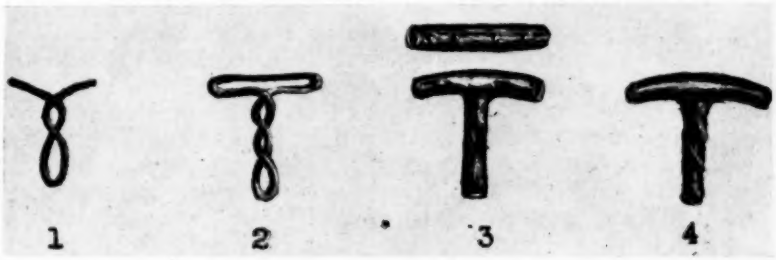

Fig. 3. Different types of inserts used in order of design. Base of No. 3 perforated to facilitate drainage.

In a few cases I have used a fine gold tube, T shaped, with a caliber of ¼ mm. (Fig. 3, No. 3) instead of the wire, to provide drainage. But so far, I have not been able to determine that the tube gives any better results than the wire.

Lately, I have been using an insert like No. 4, Fig. 3. It is made from 22 carat solid gold, about ½ mm. thick. The arm that enters the anterior chamber is fashioned like a spiral. The part outside the chamber is perfectly

Fig. 4. Showing insert in position.

smooth. It has also given satisfactory results.

The first gold insert that I used was not made exactly as described above. The arm into the anterior chamber had just one turn in it, and the ends of the wire were bent at right angles to it, without being rebent and fused, with the result that the patient came back about a year after the operation, complaining of a pricking sensation in the upper eyelid. On examination, it was found that one end of the wire had penetrated the flap and was irritating the eyelid. The old insert was removed and replaced by one of the type first described, No. 2. The tension in the eye was found to be normal and the eye has been comfortable since. In another case, the insert showed signs of coming thru the conjunctiva and was removed. We did not replace the insert, as we wanted to see whether the fistula would remain patent or not. But the patient never reported again and his whereabouts is not known, at the present time.

In one case, (No. 22) the patient returned after about two years and three months, complaining of pain in the eye operated on. On examination, it was found that the insert had slipped out of the anterior chamber, and the opening had closed, completely. The reason for this was that the arm of the insert placed in the anterior chamber was considerably shorter than the others we had used.

TECHNIC OF THE OPERATION.

Eserin is instilled before the operation to produce contraction of the pupil. The eye is prepared as carefully as for a cataract operation, and cocain anesthesia is used in all cases of chronic simple glaucoma. A large and thick conjunctival flap is raised from the upper part of the globe and dissected up to the limbus. With a small keratome an incision is made into the anterior chamber. The incision should commence about 1 mm. behind the limbus and be directed well forward. During this manipulation the flap is held up with forceps and turned back a little as soon as the keratome has been well inserted into the sclera, so as to give a full view of the cornea. A gentle traction on the flap at the same time will help to steady the eye. On withdrawing the keratome the aqueous will in some cases escape, but I have never found this a serious drawback.

The conjunctival flap is next turned forward over the cornea, and the opening of the incision well defined. The wire, which has been thoroly sterilized by boiling, is now placed in position with a special introducer. (See Fig. 2.) The twisted arm of the wire is introduced thru the incision into the anterior chamber and the fine wire loop should be easily visible thru the upper margin of the cornea when in proper position; the base of the wire should rest snugly in the depression at the sclerocorneal junction. The conjunctival flap is next laid back over the wire and replaced carefully with fine

forceps. Suturing the flap is not necessary if the eye is closed with care, and without disturbing the flap. Light dressing is applied to both eyes and patient sent to bed.

The after treatment is very simple. If the patient is comfortable, as he should always be, the eye is dressed on the second day after the operation; and then daily while in the hospital. If the patient complains of pain and much discomfort in the eye shortly after the operation, the dressing should be removed at once, and the eye carefully examined to see if the flap is in proper position. If it has turned down, it must be replaced carefully, or sutured in position.

At the first dressing the conjunctival flap will be found very edematous, and the anterior chamber may, or may not, be reformed. In one of my cases it did not reform till the sixth day after the operation, but no harm resulted. As a rule, however, the chamber reforms early; the margins of the flap heal; the edema subsides and only a bleb remains directly over the wire above the cornea. When the anterior chamber has fully reformed the point of the insert should be seen just behind the posterior surface of the corneal margin, well in front of and free of the iris.

The patient is allowed to get up, usually on the third or fourth day after the operation, and discharged from the hospital after five to eight days. No eserin is used after the operation.

For the guidance of those who would care to try this method I lay special emphasis on the following points:

1. Careful asepsis thruout and thoro sterilization of the insert.
2. Make the conjunctival flap fairly large and thick as possible.
3. Do not dissect too closely to the cornea, as the conjunctiva at that point becomes very thin and does not form a good covering for the insert.
4. When making the incision into the anterior chamber, direct the point of the keratome well forward, so that you just clear nicely the posterior surface of the cornea.
5. The insert should be carefully fashioned and the arm that goes into the anterior chamber should be twisted spirally. I consider this last point of prime importance in keeping up the drainage of the aqueous.

I am well aware that this operation may be condemned by many on theoretic grounds. The tranditional fear of a foreign body in the anterior chamber is difficult to shake off. The fact remains, however, that in none of our cases has there been the slightest sign of irritation or discomfort, that could be attributed to the presence of the insert in the eye, except as stated above, where the wire penetrated the conjunctiva. Unfortunately, nearly all of our cases have been from the country and many of them have never returned for inspection. But we have been able to keep in touch with some of them, and have had reports from them from time to time. Thirty-two eyes have now been operated on by this method, in 25 cases. Ten eyes were operated on by the tube method and the others had the wire operation.

In two cases the operation failed, as was to be expected. The eyes had been blind for some time, had shallow anterior chambers, complete posterior synechia, with periodic inflammatory attacks. One (case 4) was operated on in a private home, under unfavorable conditions. The eye was badly congested at the time and very painful. The patient had diabetes and chronic nephritis, and was not a good subject to operate on. The conjunctival flap made in this case was too small to provide a good covering for the insert, with the result that the base became partly exposed and it had to be removed. An iridectomy was performed, but that also failed to give desired relief, so the eye was finally enucleated.

The other (case 14) with O. D., blind and painful, high tension and showing changes of degeneration. The insert relieved the tension and the eye was quiet for nearly 18 months. Then the eye became painful again, with total obliteration of the anterior chamber, but there was a drainage along the wire. As the eye was totally blind and

failed to respond to further treatment, and was exceedingly painful, enucleation was resorted to.

Case No. 5 is of particular interest, as it presents some unusual features. I have for that reason given the notes of that case in greater detail in the appendix. Dr. W. Harvey Smith, Chief of the Ophthalmological staff at the Winnipeg General Hospital, conducted this case with me. I am, therefore, greatly indebted to him for his invaluable cooperation and excellent advice, given freely and friendly on all difficult occasions. I place to his credit the successful outcome of this case.

Case No. 6 is also of special interest. That patient returned after three years and three months, with extensive ulceration of the lower half of the cornea of the eye operated on. This followed an injury from a piece of straw two weeks before he came. There was considerable purulent discharge, and slight chemosis of the bulbar conjunctiva. The vision had remained about the same up to that time. The insert was in good position and tension normal. With appropriate treatment the ulcer healed, but the vision was lowered on account of the corneal opacity resulting from the ulcer. This case seems to show that the wire operation is fairly safe from late infection.

If after this operation the tension is found to be full or increased, one should press gently with the thumb finger on the margin of the upper eyelid just over the base of the insert. The loop of the wire will be seen to move slightly further into the anterior chamber, and recede on relaxing the pressure. By doing this a few times adhesions formed around the arm entering the anterior chamber are loosened up, and the aqueous will drain better along the wire into the subconjunctival space.

In some of the cases where the insert has been in contact with the iris for several weeks or more, some atrophy of the iris with distortion of the pupil has resulted. Apart from that, no unpleasant symptoms have occurred, and in none of our cases have we been able to determine that the insert excites exudate in the anterior chambers.

ADVANTAGES OF THIS OPERATION.

1. Its extreme simplicity and the ease with which it can be performed.
2. It forms permanent communication between the anterior chamber of the eye and the subconjunctival space.
3. Minimum of traumatism inflicted on the diseased eye by this operation.
4. No hypotension.
5. In case the tension should go up, slight manipulation of the insert by a sterile probe, or alternate pressure and relaxation on the base of the insert, with the thumb finger thru the upper eye lid, will reestablish the drainage.
6. Patient confined to hospital for a relatively short time.

RESULTS.

Brief Summary.

Because of the fact that we have not been able to keep in touch with all our patients and examine them from time to time, we cannot give an absolutely correct summary of the cases operated on. But we may say, that from a surgical point of view, there were as far as we know:

Total failures, 9.37%.
Partial failures, 12.5%.
Successful, 78.12%.

Altho this operation has not given perfect results, yet on the whole it has given me better results than any other operation I have tried, and with improved technic and guided by the outcome of cases already operated on, I hope still better results will be obtained in the future.

Finally, I wish to acknowledge my thanks to Dr. A. G. Blondal for the drawings.

NOTES AND CASES.

CASE 1. Mrs. E. B., age 64 years. First seen November 28, 1916. Five days ago developed acute pain in the right eye, associated with vomiting and severe headache. On the second day the local physician was called to see the patient and he administered morphin to relieve the pain. When she came to see me she still was suffering intensely. There was profound chemo-

sis of the bulbar conjunctiva, cornea cloudy, pupil dilated, anterior chamber deep. T. = 68 mm. Eye blind over a year. Patient was given the usual medical treatment but there was no improvement in her condition and no reduction in tension.

On December 1st, patient was operated on under general anesthesia. A gold wire loop was introduced into the anterior chamber beneath a conjunctival flap. On December 2nd, patient feeling well, quite comfortable and felt no pain in the eye. December 3rd, eye was dressed. Anterior chamber beginning to reform. Conjunctival flap was edematous and there appeared to be good drainage.

December 8th patient left hospital, the eye was quiet, there was only slight circumcorneal injection and T. = 25 mm. The media were now clear and an examination with the ophthalmoscope revealed deep cupping of the disc. On March 15th, 1917, the patient returned, complaining of pricking sensation in the right upper eyelid. On examination it was found that one arm of the wire had penetrated the conjunctival flap and was the cause of the trouble. T. = 25 mm., no circumcorneal injection; the eye had been comfortable since the operation. The old insert was removed and replaced by the modified type, No. 2. Since then patient has made no complaint.

Case 2. Mr. O. T., 47 years of age. First seen December 3rd, 1917. Complained of loss of vision in the right eye. R. V. = hand movements. L. V. = 20/30 nearly. Deep cupping of the right disc, slight cupping of the left disc, left field quite contracted. R. T. = 60 mm. L. T. = 40 mm. Had been using eserin steadily twice a day for nearly two months. On January 4th, 1917, wire operation on both eyes. Patient made uneventful recovery and left the hospital January 12th, both eyes comfortable. T., —1 both eyes. On January 15th, R. T. = 20 mm. L. T. = 20 mm. No improvement in the vision in the right eye. L. V. = 20/20. There was a small bleb over the base of the wires, above the cornea, in both eyes; and there appeared to be good drainage. Patient was not seen again until July 7th, 1920. R. V. = P. L. L. V. = 20/20. No further changes in the left disc. Right disc very pale. Left field slightly contracted. Patient last heard from three months ago, stating eyes comfortable. Right eye totally blind. Vision in left eye remaining about the same.

Case 3. Mr. G. J., age 70 years. First seen November 21st, 1917. R. V. = 20/70. L., totally blind for two years. Deep cupping of both discs. R. T. = 40 mm. L. T. = 65 mm. Patient stated that he had had a few painful attacks in the left eye, which passed off after applying hot cloth to it for a few hours. Patient given eserin and pilocarpin. November 26th, R. T. = 35 mm. L. T. = 50 mm. Wire operation performed, both eyes. First dressed November 28th. Eyes comfortable, no reaction. A. C. reformed in both eyes. Large bleb over base of wire showing good drainage. December 1st, patient left hospital in good condition. T., —1 both eyes. December 14th, R. T. = 20 mm. L. T. = 25 mm. R. V. = 20/50. Patient went home and was ordered to report after six months. He then wrote, stating that his vision in the right eye remained about the same. Was heard from in December, 1920. He then stated that he had not had any more painful attacks in the left eye, and that the vision remained about the same in the right eye. Patient has since died.

Case 4. Mr. J. T., age 63 years. First seen December 24th, 1917. Subacute glaucoma in the right eye. Eye tension +2, shallow anterior chamber and complete posterior synechia, eye totally blind, had suffered from iritis. Patient was also suffering from chronic nephritis and diabetes. An attempt was made to operate on this patient under local anesthesia, in his private home, but the eye was too painful and the patient was not a good subject to operate on. The conjunctival flap made in this case was too small to form a good covering for the base of the wire, with the result that the wire became exposed after several days and had to be removed. First, after the operation,

the patient was relieved and the pain in the eye subsided, but after the insert was removed the tension rose again. Iridectomy was then attempted, but that also failed to give the desired result. The iris was badly adherent to the lens. The eye was ultimately enucleated.

Case 5. Mr. M. M. C., age 50 years. First seen December 14th, 1917. Complained of failing vision. One week before, spark from hot iron had struck him in the right eye. He did not feel much pain, but could not see with the eye after, so consulted a specialist. He was told that he had chronic glaucoma and was advised to go to the hospital for treatment. He had never noticed before that he could not see well with the right eye. On admission, R. V. = P. L. L. V. = 6/24, pupils normal, A. C., rather shallow, R. T. = 65 mm. L. T. = 35 mm. Left field greatly contracted. Put on eserin, t.i.d. ¼%. December 18th, pupils well contracted. R. T. = 35 mm. L. T. = 20 mm. Hordeolum developed on right lower eyelid, with slight conjunctivitis. This received the usual treatment. Eserin continued. December 30th, slight conjunctivitis in right eye. R. T. = 40 mm. L. T. = 22 mm. Pupils well contracted. January 7th, 1918, conjunctivitis had cleared up. R. T. = 52 mm. L. T. = 20 mm.

January 8th, wire operation on right eye. January 10., eye dressed; no reaction. A. C. reformed, wire in good position, eye soft. January 12, patient comfortable, up and about ward. R. T. = 12 mm. L. T. = 20 mm. January 13th, very slight discharge on dressing, conjunctiva more red and injected, no pain in the eye. Usual treatment ordered for the conjunctival condition. January 15th, practically no discharge on dressings, conjunctival injection subsiding. January 22nd, patient complained of headache. Condition of right eye improved. T., —1, good bleb over the base of the wire.

January 23d, patient had a bad night, headache and vomiting and severe pain in L. E. The eye is very tender today with all the symptoms of acute glaucoma developing. T., +1, vision cloudy. Given eserin and pilocarpin and dionin every hour. Acetophen for pain and enema and saline purgation. January 24th, condition of patient worse. L. V. = hand movements, pupil dilated in spite of miotics used. A. C., shallow, severe edema of bulbar conjunctiva. After consultation with Dr. Harvey Smith wire operation was performed under general anesthesia. January 25th, patient had a good night, no pain, A. C. reforming. T., —2. January 26th, condition more satisfactory, patient allowed to get up. L. V. = fingers at 3 ft. Sphincter pupillae contracted except in the upper and inner quadrant, where it seems paralyzed. Patient comfortable, edema subsiding. T., —2, good bleb over wire. January 30th, complains of headache and abdominal pain. L. T., slightly elevated.

January 31st, had severe pain in left eye last night. L. V. = fingers at 2 feet. T. = 60 mm. no bleb over the wire, slight chemosis of bulbar conjunctiva. Eye cocanized and wire slightly moved with a silver probe, bleb formed instantly over the wire. T., diminished. February 3d, steady improvements. L. V. = fingers at 30 ft. February 8th, there has been steady improvement. T. = 25 mm. in each eye. R. V. = fingers at 3 ft to the temporal side. L. V. = 2/10. On February 28th, L. V. = 5/10 with correction. There appears to be good drainage, but the left pupil is still irregularly contracted. The upper and inner quadrant seems paralyzed since the first severe attack and has not recovered. That section of the sphincter pupillae is slightly discolored and does not respond to eserin. Patient discharged from hospital.

April 2nd, 1918, patient developed acute attack in L. Eye became very painful in a few hours. On admission to the hospital L. V. = fingers at 6 ft. T. = 65 mm. R. T. normal. Patient given calomel, saline and fomentations. April 4th, patient feeling slightly better today, slight improvement. There appears to be considerable drainage along the wire. April 9th, L. T. = 40 mm. Eyes irritable and tender on palpation. Iridectomy

performed by Dr. Harvey Smith. That portion of the iris which never recovered after the first acute attack was excised. The wire was left in its position. April 11th, eye dressed. T., low; patient felt much better. April 14th, all inflammation gradually subsiding, vast improvement. April 20th, L. T. = 18 mm. L. V. = 3/10, patient comfortable. Patient discharged from the hospital. The patient had no further trouble and his sight in the left eye gradually improved. On December 2nd, L. V., + .75 S. + a cyl. ax. 150 = 20/40.

Seen again September 14th, 1922. Same vision maintained. Came again for examination July 15th of this year. T., normal in both eyes. R. V. = p. 1. L. V. = 1/10. Discs quite pale.

Case 6. Mr. T. V., age 60 years. First seen January 29th, 1918. R. V. = fingers at 18 ft. L. V., blind for years. R. T. = 70 mm. L. T. = 75 mm. Deep glaucomatous cupping of both discs. January 30th, wire operation performed on R. February 1st, eye dressed, no reaction; A. C. not reformed. There is a very marked edema of the conjunctival flap. February 6th, A. C. just beginning to reform; eye very soft and pink, but comfortable. February 11th, eye looks well. T. = 23 mm. R. V. = fingers at 20 ft. Patient went home. May 13th, 1921, patient returned, stating that two weeks ago R. became very painful and inflamed. The sight gradually faded, examination revealed a large sloughing ulcer on lower half of the cornea of the right eye, involving the pupillary area. R. T. = 20 mm. Patient stated that the vision had remained the same as before the operation until the eye became inflamed. Ulcer carefully ionized with zinc sulphat ¼% solution 1 —2 m. amp. for 5 min. There was considerable purulent discharge and slight chemosis of the bulbar conjunctiva. I was afraid that intraocular infection might develop in this case, but fortunately no complications occurred. The ulcer healed readily after the ionization, but the sight was much reduced on account of the corneal opacity remaining. The patient returned home on May 30th. R. V. at that time = fingers at 10 ft. R. T. = 20 mm. Organism, staphylococci.

Case 7. Mr. H. J., age 65 years. First seen January 21st, 1918. R. V. = P. L. L. V. = 20/200. R. T. = 85 mm. L. T. = 82 mm. Patient given eserin and pilocarpin to use. January 25th, pupil well contracted. R. T. = 65 mm. L. T. = 63 mm. Vision about the same. February 1st, R. T. = 70 mm. L. T. = 65 mm. February 4th, tension the same as at last examination. Wire operation performed on both eyes. February 6th, patient dressed for the first time. A. C. beginning to reform. T., low. Patient comfortable, no sign of reaction. February 12th, patient has made an uneventful recovery. Both eyes comfortable. T., —1. February 20th, R. V. = hand movements. L. V. = 20/100. R. T. = 25 mm. L. T. = 23 mm. Patient has not reported since for examination, but a letter received from him, dated May 12th, 1921, states that vision remained about the same in the left eye, but the right eye was totally blind.

Case 8. Mrs. A. P., age 50 years. First seen May 4th, 1918. Blind since childhood, cause unknown. Had never had any trouble in that eye until 6 days before, when the eye became red and painful. On examination T. = 64 mm. Cornea normal, iris slightly discolored, pupil contracted, media cloudy, no details of fundus can be seen. Patient given eserin, purgatives and light diet. May 10, patient slightly worse, is suffering more pain. Wire operation performed, under general anesthesia. May 12, patient has been comfortable since the operation, no pain in the eye, eye dressed today. A. C., reforming. May 14th, patient comfortable, allowed to get up. T., normal. July 8th, T. = 20 mm. There is good drainage, all inflammatory symptoms subsiding. Patient has reported for examination several times since, and the tension has remained within normal limit and patient has had no further trouble.

Case 9. Mrs. E. L., age 54 years. First seen December 14th, 1918. Chronic glaucoma. Right eye blind

for 25 years, cause not known. L. V. = fingers at 12 ft. R. T. = 65 mm. L. T. = 45 mm. Right lens cataractous, pupil dilated, iris atrophied. Patient given eserin and pilocarpin for left eye. December 16, L. T. = 40 mm. Wire operation performed on L. December 23, patient made good progress, eye comfortable. T., —1. January 15, 1919, L. T. = 18 mm. Wire in good position with good drainage. L. V. +1.50 cyl. ax. 15° = 1/5. November 30, 1922, L. T. = 20 mm. V. = 1/5 with correction.

Case 10. Mr. K. J., age 64 years. First seen December 16, 1918. Chronic glaucoma. Right eye blind for two years. L. V. = 20/40. Deep cupping of both discs; left field quite contracted. R. T. = 60 mm. L. T. = 40 mm. Given eserin and pilocarpin. December 20, R. T. = 60 mm. L. T. = 35 mm. Wire operation performed on O. S. December 30, patient has made an uneventful recovery. Eye comfortable. Tension minus. January 28, 1919, L. V. = 20/40. L. T. = 24 mm. March 8th, 1923, L. T. = 25 mm. L. V. = 20/40.

Case 11. Mr. A. A., age 59 years. First seen December 18, 1918. Right eye blind for over a year. Has had few painful attacks in the right eye. L. V. = 20/20. R. T. = 75 mm. L. T. = 25 mm. Deep cupping of the right disc, left disc appears normal. Given eserin and pilocarpin for right eye. December 31, R. T. = 55 mm. Pupil well contracted. Wire operation performed. January 8, patient made good recovery. R. T. = 20 mm., no reaction, wire in good position and appears to give good drainage. Patient has had no painful attacks in this eye since the operation.

Case 12. Mr. S. H., age 77 years. First seen December 30, 1918. Chronic glaucoma. Right eye blind for 5 years. L. V. = 20/70. R. T. = 60 mm. L. T. = 40 mm. Left field greatly contracted. Deep cupping of both discs. December 31, wire operation performed on left eye. January 8, patient has made uneventful recovery, there appears to be good drainage. T.. minus. Eye comfortable. January 28, L. T. = 22 mm. L. V. = 20/70. Wire in good condition, good drainage. Patient seen again October 18, 1919. L. V. = 20/100. L. T. = 24 mm. Left disc very pale. Seen on March 20, 1921, sight in left eye still failing. L. T. = 22 mm. There appears to be good drainage along the wire. L. V. = fingers at 20 ft. Failing vision attributed to optic nerve atrophy. Patient not seen since.

Case 13. Mr. J. H., age 72 years. First seen December 15, 1918. Chronic glaucoma. R. V. = 20/100. L. V. = 20/70. Deep cupping of both discs. Both discs rather pale. R. T. = 60 mm. L. T. = 55 mm. Given eserin and pilocarpin. January 2, 1919, vision remains the same as when first examined. R. T. = 50 mm. L. T. = 45 mm. Wire operation, both eyes. January 9, patient has made an uneventful recovery, tension low, both eyes. Patient left hospital today. January 18, no change in vision. R. V. = 20/100. L. V. = 20/000. R. T. = 23 mm. L. T. = 25 mm. Wire in good position, drainage appears satisfactory. This patient has not returned for examination, but letter received from his friends January 10, 1924, states that his vision is very poor, but he has had no painful attacks.

Case 14. Mr. C. I., age 57 years. First seen February 6, 1919. Chronic glaucoma. Right eye blind for seven years. Has had periodical painful attacks in that eye. L. V. = fingers at 10 ft. Field very contracted. Considerable cupping of disc. No details of fundus can be made out in the right eye. R. T. = 60 mm. L. T. = 35 mm. Eserin prescribed for left eye, twice a day. February 9th, wire operation on R. February 11th, condition satisfactory. Tension low, patient comfortable. February 20th, R., painful today; blood in A. C. Eye quite hard. Drainage does not appear to be sufficient along the wire. Eye cocainized and insert moved slightly with a silver probe. Drainage improved. February 24, condition gradually improving. tension lower. March 14, O. S. operated on; gold tube introduced into the anterior chamber beneath the conjunctival flap.

March 16, left eye dressed today; tube in good position, tension low, no sign of reaction. March 18, patient has made satisfactory recovery. R. T. = 25 mm. L. T. = 20 mm. Sight in L. remains about the same as before the operation. Patient discharged. February 10th, 1920, patient returned to the hospital with the right eye painful. Examination of eye revealed marked circumcorneal injection. Anterior chamber almost obliterated. Tension, 80 mm. Vision in left eye holding its own. Tube in good position, with good drainage. Patient was given usual medical treatment for the right eye for several days but as there was no improvement in his condition the eye was finally enucleated. Patient seen again March 15, 1922. L. T. = 20 mm. Tube in good position; there was good drainage. L. V. = fingers, about 6 ft. Disc rather pale.

Case 15. Mrs. F. H., age 60 years. First seen February 8, 1919. Chronic glaucoma. Right eye blind for two years and painful off and on for last six weeks. Vision in left eye = 20/20. R. T. = 65 mm. Pupil rather dilated, anterior chamber fairly deep. Slight corneal injection. Given eserin and pilocarpin. March 13, has been slight improvement in patient's condition, pupil fairly well contracted. No circumcorneal injection. T. = 55 mm. Gold tube operation performed. March 19, patient made uneventful recovery. Tube in good position. T. = 20 mm. Patient last seen August 11, 1921. Tension in right eye = 25 mm., has been quiet and comfortable, no changes so far in the left eye.

Case 16. Mr. M. B., age 73 years. First seen March 3, 1919. Chronic glaucoma in left eye. R. V. = 20/20. L. V. = 20/100. Deep cupping of left disc, no cupping of right disc. Has had two painful attacks in left eye during the last month and sight failing very rapidly; was much worse after each attack. R. T. = 25 mm. L. T. =65 mm. Given eserin. March 14, L. T. = 50 mm. Eye has been comfortable since he started to use the eserin; gold tube operation performed. March 19, patient has made a good recovery, no reaction. A. C. beginning to reform, eye soft. March 25, L. T. = 20 mm. Good bleb over base of tube, eye comfortable. April 5, L. T. = 22 mm. L. V. = 20/100. Patient not heard from since.

Case 17. Mr. B. A., age 59 years. First seen April 1, 1919. Chronic glaucoma. R. V. = 20/30 plus 3. L. V. = hand movement. R. T. = 25 mm. L. T. = 65 mm. Deep cupping of left disc. No changes in the right. Gives history of marked discomfort in the left eye when out in the cold, on a winter's day. June 2, gold tube operation performed on L. June 7, patient has made uneventful recovery, no sign of reaction. T., minus 1. Left hospital today. This patient has not returned for examination, but reported by letter on April 12, 1922, that the eye has been comfortable since the operation and the sight remained the same in the other eye.

Case 18. Mrs. A. E., age 63 years. First seen on June 15, 1919. Chronic glaucoma. R. V. = 20/100. L. V. =20/200. R. T. = 25 mm. L. T. = 35 mm. This patient had double iridectomy performed in 1915. Patient stated that the vision at that time had been fairly good, but during the last twelve months there had been a marked change for the worse, particularly the last three months. The sight had failed fairly rapidly in the left eye; she stated that the sight had always been better in the left eye than in the right. On June 19, 1919, operation performed on the left eye, a gold tube was introduced into the anterior chamber, external to the iridectomy. June 22, eye dressed today, no reaction, eye soft, tube in good position, A. C. well reforming. June 27, patient made uneventful recovery. A. C. well reformed, tube in good position, good drainage. Patient left hospital today. Patient last seen March 19, 1920. V. = 20/200 in each eye. R. T. = 25 mm. L. T. = 23 mm. Tube in good position, giving good drainage. Patient has not been heard from since. Both discs pale.

Case 19. Mrs. S. E., age 79 years. First seen October 8, 1919. Chronic glaucoma. Right eye totally blind for

three years. L. V. = fingers at 2 ft. A. C. fairly deep in both eyes. Deep cupping of both discs. R. T. = 65 mm. L. T. = 46 mm. October 9, gold tube operation in left eye. Made good recovery. Left hospital October 14. October 20, L. V. = fingers at 6 ft. L. T. = 23 mm. Good drainage. Patient last heard from January 3, 1922, to the effect that the patient had still sight enough to enable her to find her way about the house.

Case 20. Mrs. H. O., age 47 years. First seen October 21, 1919. Chronic glaucoma. R. V. = 20/100 nearly. Left eye blind for 6 months. R. T. = 45 mm. L. T. = 55 mm. Deep cupping of both discs. A. C. rather shallow in both eyes, pupils semidilated, given eserin and pilocarpin. Seen again November 14, vision the same as at the first examination and no reduction in tension. November 15, gold tube operation performed on right eye. November 20, patient has made good recovery, A. C. well reformed, T. normal, patient left hospital today. May, 14, 1920, R. V. = 20/70. T. normal, can read J. 1 with plus 1.50 S. This patient last seen on June 5, 1922. R. V. = 20/100. R. T. = 23 mm. Incipient cataract in the right eye, which probably accounts for failing vision.

Case 21. Mr. A. S., age 48 years. First seen October 25th, 1919. Chronic glaucoma. R. V. = fingers at 18 ft. L. V. = 20/100. R. T. = 65 mm. L. T. = 65 mm. Deep cupping of both discs. Patient has 3 diopters of hyperopia. Given eserin and pilocarpin and was ordered to report in a week. Patient did not return until May 14, 1920. R. V. = P. L. L. V. = 20/200. Two days ago severe pain started in the right eye and sight failed rapidly. There is marked circumcorneal injection of that eye, pupil semidilated, A. C. shallow in both eyes, has now considerable pain in the right eye. R. T. equals 80 mm. L. T. = 60 mm. Patient advised immediate operation, but owing to religious scruples refused to have an operation.

Patient given eserin and pilocarpin, strong purgatives, light diet, salicylates. May 17, patient feels somewhat better, but right pupil does not contract under eserin. R. T. = 70 mm. L. T. = 50 mm. June 17, last night patient had very severe pain in the right eye and suffered intensely. The eye feels very hard on palpation, marked circumcorneal injection, pupil dilated and patient is suffering considerably. Same treatment continued and fomentations applied freely. June 23, inflammatory conditions of the right eye has now almost completely subsided. R. T. = 65 mm. L. T. = 55 mm. After much persuasion patient has consented to have operation performed. Patient sent to hospital, gold tube operation performed on both eyes. June 25, making good recovery, no reaction, no pain. June 30, left hospital today, feeling well, tension minus both eyes. Sight in left eye the same as before the operation. July 6, R. T. = 23 mm. L. T. = 20 mm. July 16, tension normal both eyes, right eye quiet and comfortable. Has no pain in that eye since the operation.

R. V. plus 3. S. ⌒ plus 1.50 cyl ax. 135° = 20/40 plus 3. Seen again on June 8, 1922, vision in left eye maintained. Tension normal in both eyes, there is good drainage, slight bleb over the base of inserts above the cornea. Patient now happy that he had the operation. Last seen October 10, 1924. T. normal both eyes. Atrophy of iris beneath arm of insert in left eye, causing coloboma of iris at that point. No sign of irritation. L. V. with correction = 20/50. Left disc rather pale.

Case 22. Mr. J. H., age 62 years. First seen, March 10, 1920. Chronic glaucoma in left eye. R. V. = 20/20. L. V. = hand movement. No change in right eye, slight cupping of the left disc which is very pale. R. T. = 25 mm. L. T. = 65 mm. Given eserin. March 24, no reduction in tension in the left eye, altho the pupil is well contracted. Gold tube operation performed in left eye. March 26, patient has been comfortable, no reaction, eye soft. March 30, patient has made uneventful recovery. A. C., reformed. There appears to be good drainage, eye soft. Patient not seen again until June 5, 1922, when he returned to the hos-

pital complaining of pain in the left eye. On examination it was seen that the tube had slipped out of the anterior chamber, which was then almost totally obliterated. Pupil widely dilated, lens cataractous, iris showing atrophic changes, R. T. — 40 mm. L. T. = 60 mm. The vision in the right eye fingers at 20 ft. There is slight cupping of the discs, quite atrophic, shallow anterior chamber. The gold tube removed, patient given eserin for the right eye. June 15, the patient has been kept under observation, tension in the right eye has come down to 25 mm., under eserin. The left eye has quieted down under fomentations, patient has also been given purgatives freely and kept on light diet, teeth are in bad condition and are now receiving attention. January 12, 1924, this patient has not reported to the clinic for six months. Good deal of pain in L. R. V. = fingers at 2 ft. Right disc very pale. R. T. = 35 mm. L. T. = 70 mm. Patient passed into other hands.

Case 23. Mrs. V. S., age 66 years. First seen April 8th, 1920. Chronic glaucoma. Right eye blind for over a year. L. V. = 20/70. Anterior chamber rather shallow, deep cupping of left disc. The disc is very pale. Patient states that the sight of the left eye has failed rapidly during the last three months. R. T. = 65 mm. L. T. = 45 mm. Given eserin and pilocarpin. May 18th, 1920, R. T. = 60 mm. L. T. = 35 mm., left field very contracted. May 20, gold tube operation on left eye. May 25, patient making good recovery, no reaction, anterior chamber shallow, eye soft. May 31, L. V. = 20/50. L. T. = 18 mm., eye looking well. September 1, 1920, patient returned, saying that the sight is not so good as after the operation. L. V. = 20/70. L. T. = 20 mm. Anterior chamber normal. Disc looks very pale. Reduced vision attributed to continued atrophy of the optic nerve. Patient has not returned for examination, but we have been informed lately that she is almost totally blind.

Case 24. Mrs. E. J., age 65 years. First seen June 18th, 1920. Chronic glaucoma. R. V. = 20/70. Left eye blind for nearly three years, sight in right eye has been failing rapidly during the last six months. A. C. normal in both eyes, deep cupping of both discs. R. T. = 50 mm. L. T. = 70 mm. June 19, wire operation performed on both eyes. June 27, patient made good recovery. No complications and no reaction. Tension minus both eyes. Left hospital today. June 29, condition good. R. V. plus 1.50 cyl. = 20/50. T normal in both eyes. Seen again October 19, 1921. Vision in right eye remains the same, tension normal in both eyes. Patient not seen since, nor heard from.

Case 25. Mr. S. T., age 63 years. First seen November 10th, 1920. Chronic glaucoma. Right eye blind for three years. L. V. = 20/20. Has had several painful attacks in the right eye during the last three months. R. T. = 80 mm. A. C. rather shallow, cornea somewhat cloudy, slight circumcorneal injection, pupil rather dilated. November 12, gold insert operation right eye. November 15, condition good, patient comfortable. November 19, A. C. just beginning to reform. Tension rather poor and eye somewhat tender on palpation. December 14, patient has made rather slow recovery, the eye has been irritable at times, but appears to have now quieted down. Tension = 25 mm. Anterior chamber very shallow. December 18, patient has been comfortable during the last three days, circumcorneal injection has disappeared and general appearance of the eye more satisfactory. Patient left for home today. Last heard from April 14th, 1923, saying that the eye has been comfortable ever since he returned home after the operation.

COLOBOMA OF IRIS, CHOROID AND OPTIC DISC WITH DETACHMENT OF THE RETINA.

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ROCHESTER, MINNESOTA.

In two cases reported here one eye of each was almost or quite blind with retinal detachment. In one patient the other eye was quite normal, but in the other both eyes presented colobomas and the second eye was beginning to fail. The literature of cases to some extent similar has been reviewed and references thereto appended.

CASE 1. A woman, aged thirty-seven, was examined at the Mayo Clinic December 15, 1924. She complained chiefly of aching pains in the lower lumbar region, and stiffness of the back. She had had poor vision in the right eye since birth. There was no history of inflammation of, or injury

Fig. 1. Coloboma of the iris.

to, the eye. The vision of the left eye had always been good.

General examination revealed chronic infectious arthritis of the spine and sacroiliac joints, marked dental sepsis, mild chronic cholecystitis, a small adenomatous goiter without hyperthyroidism, and mild chronic diabetes of the type associated with obesity. The blood Wassermann reaction was negative.

Examination in the Section on Ophthalmology revealed that the left eye had a central visual acuity of 6/6 and a normal peripheral field. Objectively, the eye was entirely normal. With the right eye the patient could distinguish only moving objects, and no definite field could be mapped out. The lids and palpebral and ocular conjunctivae were normal. The eye was normal in size, shape, and position. The cornea was of normal size and clear, and the anterior chamber was of normal depth. In the iris there was a congenital coloboma directed downward, measuring 3 mm. at the limbus. The lens was in normal position and showed in its inferior nasal quadrant some finely globular opacities in the anterior cortical layers. There were some gaps in the zonular fibers visible thru the coloboma (Fig. 1).

In the fundus was a large complete coloboma of the inferior choroid, involving 60 degrees of its circumference at the periphery and extending upward to include the optic disc. The surface of the exposed sclera was not ectatic and was traversed by two large and two small blood vessels apparently belonging to the retinal circulation. These vessels appeared to emerge over the lower margin of the optic disc. This margin was indistinct and formed the lower edge of an excavation 5 diopters deep which involved the lower four-fifths of the optic disc. The upper margin of the disc was of normal color and on the level of the surrounding retina. The remaining retinal vessels emerged from the normal portion of the disc. There was no lamina cribrosa visible in the floor of the excavated disc except close to the upper margin. The margins of the coloboma were practically free from deposits of pigment and evidences of choroidal atrophy. Only a narrow rim of retina was normally attached to the choroid beyond the coloboma. The remainder of the retina was completely detached, pearly gray, and hung in massive folds and lobulations. Its surface was traversed by very dark and tortuous vessels. The vitreous was clear, except for a few fine stringy opacities (Fig. 2).

Comment. In association with coloboma of the iris, choroid, and optic disc, there have been described in the literature, as quoted by von Hippel

and Hardy, various other anomalies, such as persistent hyaloid artery, opacities of the lens, lenticonus, macular coloboma, atrophic choroidal spots, corectopia, coloboma of the lens, opaque nerve fibers, remnants of the posterior sheath of the lens, microcornea, microphthalmus, strabismus, and nystagmus. We were unable to find, however, any record of a total detachment of the retina in a colobomatous eye. On reviewing the histories of patients with coloboma of the choroid seen at the Clinic, we found a somewhat similar case.

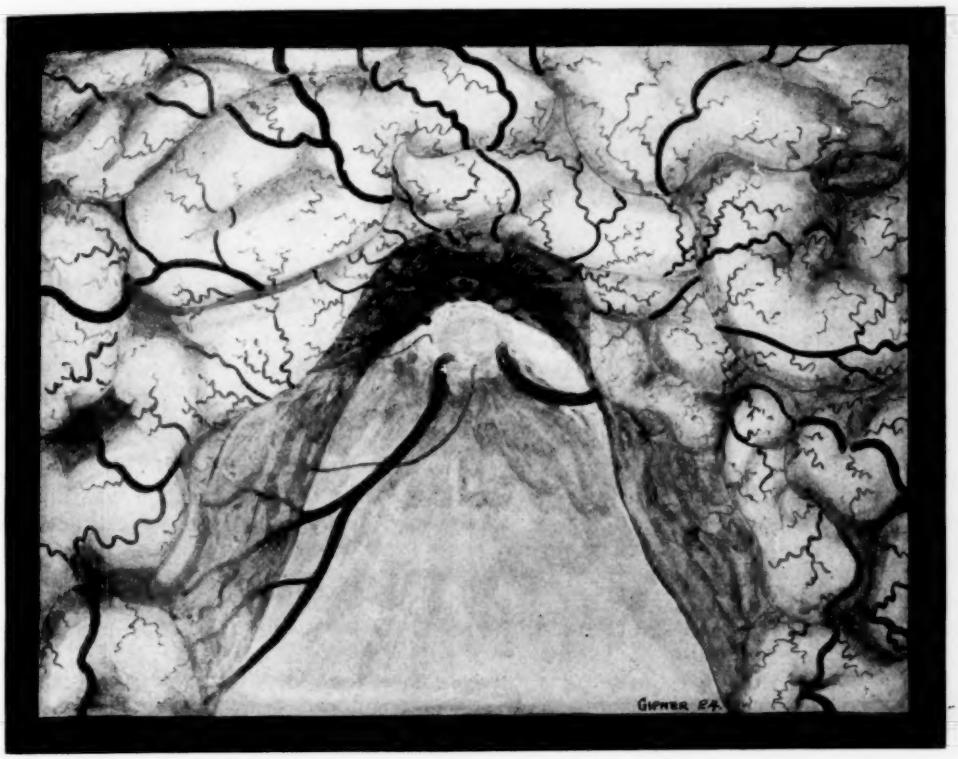

Fig. 2. Coloboma of choroid and optic disc with detachment of retina.

CASE 2. A woman, aged forty, was examined in the Clinic January 30, 1922. She was born with bilateral coloboma of the iris, but had had good vision until she was thirty-six, when she rather gradually lost the sight of the right eye. About a month before she came to the Clinic, the vision of the left eye had failed in the same manner.

Examination revealed total blindness in the right eye. There was a coloboma of the iris. The iris was partially adherent to the anterior capsule of a mature cataractous lens. With the left eye the patient could distinguish moving objects; there was a coloboma of the iris down, and in, an immature cataractous lens, opacities in the vitreous, a large coloboma of the lower choroid, and a lobulated detachment of the retina, which was complete except in the area of the coloboma.

COMMENT.

The detachment in this case was undoubtedly inflammatory in origin, for posterior synechiae, vitreous opacities, and cataracts were present. The loss of vision was gradual and not sudden, as would be expected were the detachment traumatic in orgin. Moreover there was no history of trauma to the eye. We have no doubt that many similar cases have been observed altho they have not to our knowledge found their way into the literature.

DISCUSSION.

In view of the several sources of possible ocular inflammation revealed in the general physical examination of the first patient it might be justifiable to consider this retinal detachment also to be of inflammatory origin. However, there was no subjective history either of trauma to, or inflammation of, the eye and, so far as the patient knew, there had never been any decrease in the amount of vision. The cornea and iris were free from evidences of previous disease, and the opacities in the lens and vitreous were not of the type usually seen in association with chronic uveitis. The retina and visible choroid showed no cicatricial tissue formation and no patches of atrophy and pigment proliferation, such as would be expected as the sequelae of an intraocular inflammation sufficiently severe to produce an extensive detachment of the retina. We therefore feel justified in believing that the abnormal position of the retina, as well as the coloboma of the iris, choroid, and optic nerve entrance, was developmental in origin, and dependent probably on the unequal growth of the membranes of the eye, as in microphthalmus with cyst. This mechanism, as described by von Hippel on the basis of his experimental work on rabbits, is outlined by Parsons in his discussion of the pathogenesis of coloboma.

Under the heading "Congenital detachments of the retina," Leber groups cases occurring in infants in the first few months of life. These have been described by a number of authors, including Becker and Raab, and Remy, Fleischer, Allin, Marshall, Rockcliffe, Hamma, Pagenstecher, Fernandez, Collins and Clarke. There is an hereditary feature in Pagenstecher's cases and also in those reported by Collins and Clarke, and Fernandez. The descriptions of most of these cases suggest very strongly that the detachments were inflammatory in origin. Fleischer believed his case to be a development anomaly, but Leber was inclined to attribute it to fetal inflammation. The eye described in detail by Collins showed changes which were questionably the result of previous inflammation. All these cases differed from our Case 1 in having definitely recognizable fibrous tissue bands in the vitreous, and in appearing clinically under the guise of pseudoglioma

According to Benson, Deutschmann found in a rabbit's eye which he examined microscopically, a coloboma of the choroid and a high grade sclerochoroidoretinitis, with an inflammatory exudate separating the choroid from the retina. It is not stated, however, whether this exudate was sufficient in amount to have produced the clinical picture of retinal detachment.

In 1894, Rindfleisch reported a case of a typical coloboma of the choroid up and temporally from the optic disc, associated with evidence of old choroiditis. He cited this as an argument in favor of the inflammatory origin of ocular coloboma. The patient had come to him because of poor vision in the eye following a kick in the face and a consequent fall on the back of the head. Besides the coloboma, there was a folding and slight elevation of the retina in the macular region; the rest of the retina was definitely not detached. While Rindfleisch does not interpret his finding, it was probably a localized edema of the retina, traumatic in origin; there was no definitely measureable detachment as in our cases.

In both of our cases, the retinal detachment was confined to the portion of the fundus not occupied by the coloboma. It is rather usual for detachments to include the lower portion of the retina even if the starting point is elsewhere, as the accumulated subretinal fluid tends to gravitate downward. The limitation of the detachment by the edges of the coloboma would, therefore, seem to indicate either that the retina was absent over the region of the coloboma or else that it was firmly adherent at this point. Histologic examination has shown that the retina is rarely if ever absent in all its layers in choroidal coloboma. In Case 1, while the field of vision could not be definitely mapped out,

there was no striking defect to correspond to the coloboma, and in Case 2, light projection was good in all fields. Therefore, it is not probable that the retina was entirely absent. As an explanation of the etiology of coloboma of the iris, Collins has suggested an abnormal adhesion between the posterior surface of the cornea, the anterior fibrovascular sheath, and the anterior surface of the lens, which prevents the ingrowth of the iris in whole or in part. Similarly, he has considered an etiologic factor of coloboma of the choroid to be an abnormal adhesion of the retina to the mesoblast preventing the differentiation of the latter into choroid and sclera. It seems reasonable, in our cases, to assume that the presence of such an abnormal adhesion was the factor preventing the extension of the detachment to the retina over the coloboma. Perhaps this observation may be of some moment in evaluating the various hypotheses of the etiology of ocular colobomas. The adhesion of the retina to the margins of the coloboma in Case 1 may have been the factor causing the free lying portion of the retina in its subsequent development to be thrown into folds and to become detached from its normal apposition to the choroid.

Mayo Clinic.

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EXTENSIVE SARCOMA ORIGINATING FROM A PIGMENTED NEVUS OF THE CONJUNCTIVA.

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In the case here recorded the tumor when first excised appeared benign. It recurred as a spindle cell sarcoma in one and half years. It was removed and recurred again within three years of the first removal, invading both lids. The pathogenesis of such tumors is briefly discussed. Read before the Chicago Ophthalmological Society, October, 1924.

Structurally the conjunctiva is modified skin, consequently like the skin it is oftentimes the tissue of origin of congenital growth, one of the commonest of which is pigmented nevus. Pigmented nevi of both skin and conjunctiva are found during the early stages of development taking no part in the formation of the normal structure, but retaining thruout life their undifferentiated and embryonic characteristics.

For the privilege of reporting this case history I am indebted to Dr. Lebensohn, surgeon to the Illinois Eye and Ear Infirmary.

In the fall of 1912, a man 37 years of age, presented himself on account of a discoloration of the conjunctiva of the right eye. It was learned that some form of silver solution had been instilled into the conjunctival sac for an undetermined length of time, producing the picture of argyrosis of the lower folds. An area, slightly elevated, mildly oval horizontally, 3 by 4 mm. sharply outlined, movable and deeply brownish-black pigmented, was situater just posterior to the corneosclera on the nasal side. Pigmented nevus of the conjunctiva was diagnosed clinically, and, while the area showed no malignant features, it was excised for microscopic study.

The epithelial layer is thickened to 4 or 5 times the normal for this region, many of the cells are crowded with golden brown pigment; and free pigment, as well, is scattered between the cells, also quite a number of wandering cells are present in the intercellular spaces. The adenoid layer is thicker than normal, in which deeply pigmented, polygonal and cubical shaped cells are found, not arranged in papillary formation. A striking feature of the deeper fibrous layer is the engorgement of the dilated blood vessels.

Differential staining methods showed absence of iron containing pigment. Anatomic diagnosis; pigmented nevus of the conjunctiva.

About one and one half years later, he returned because of the presence of a hard smooth mass 10 by 10 by 20 mm. protruding between the lids and firmly attached by a fairly narrow pedicle to the bulb on the nasal side, at the original site of the pigmented nevus. Microscopically, this growth was a moderately vascular, nonpigmented, typical spindle cell sarcoma.

In November, 1915, three years after the removal of the pigmented nevus, he returned because both lids were much thickened, with a recurrent growth, again on the nasal side of the bulb. This time the epibulbar growth had a broad base, 8 mm. by 5 mm. broad and 4 mm. high. Both lids and the eyeball were removed.

The upper lid measured over 15 mm. in thickness, and the tumor mass, lying posterior to the tarsus, consists of both round and spindle cells, which, for the most part, are nonpigmented. One area in particular shows evidence of proliferation of cells, resembling nevus cells without pigment. Several areas of deeply pigmented cells are situated in the corium immediately beneath the basement membrane.

The lower lid is also 15 mm. thick with a large nodule on the conjunctival side consisting of cells possessing large granular nuclei, with fine strands of connective tissue scattered thruout. A dense accumulation of small round cells of inflammation are arranged about some of the bloodvessels.

Attached to the sclera on the nasal side, slightly overlapping the cornea, is a nodule consisting of nonpigmented, closely packed small round cells. The mass as a whole is poorly vascularized. Otherwise the bulb is negative, and the orbital tissue is not involved.

Anatomic diagnosis: Recurrent epibulbar sarcoma invading both lids, originating from a pigmented nevus of the conjunctiva.

In spite of the careful research on the subject of the origin of melanin, the problem is still undecided. Briefly stated, the two leading views regarding the origin of the melanin are:

(1) That it is a degenerative product of hemosiderin containing no iron and carried by chromatophores from the blood vessels to the epithelium; and (2) that it is a metabolic or secretion product of the protoplasm of pigment bearing cells—a property which certain epithelial cells possessing glandular activity would elaborate.

Growths consist of cells or tissues resembling those normally present in the body, consequently we can safely conclude that the rudiment of origin consists of similar elements. There are three possible sources to consider:

(1) They are derived from without the organism. This old hypothesis had many early followers, because it was found possible to transplant new growths from one animal to another of the same species, and it has been proved that the growth thus originating is actually derived from the tissue elements of the transplanted tumor. Such a transplantation is comparable to what occurs naturally in metastatic new growths. It is a well known fact that common skin warts are transferable from one person to another, and likewise venereal warts. But the questions arise are not the latter to be regarded as infective granulomata, and does not their manner of proliferation differ from true tumors?

(2) That growths originate from cells, or complexes, which have been "pinched off" some time during the stage of development. This is known as the Cohnheim theory. He believed than such sequestrations took no part in the formation of normal structure, but kept their embryonic characteristics, and later in life became the basis of new growths. This theory particularly interests us because it practically fulfills what takes place when a pigmented nevus takes on growth. Without entering into details, however, many suppositions connected with this theory seem very unlikely.

(3) That new growths originate directly from the normal elements of the part. A strong argument in favor of this theory lies in the fact that sometimes the cells of the tumor retain the same physiologic characteristics as those constituting the tissues from which they arise. Numerous experiments have been made to determine whether elements separated from their normal anatomic connections can be the rudiment of tumor formation. There is no one theory that satisfactorily explains the true origin of all growths.

In conclusion, it can be said that pigmented nevi of the conjunctiva are congenital growths, which sometimes show a high potential tendency to become malignant—in this case the basis for the development of, for the most part, a nonpigmented spindle celled sarcoma.

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HYSTERIC AMBLYOPIA AND AMAUROSIS.

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The manifestations of hysteria involving visual perception are here discussed and illustrated by reports of six cases, which were carefully studied. One of them went to important compensation awarded for injury. But all showed by their course or ultimate complete recovery that they were of this character. Read before the Minnesota Academy of Ophthalmology, January, 1925. (See page 388.)

It is more than probable that the cases of blindness, cured by the so-called miracles described in the Bible, were true cases of hysteric amaurosis. Hysteric amblyopia in adults has been recognized since the 17th

century, altho perhaps the first clear description of this condition under the title of retinal anesthesia was furnished by von Graefe about 1865. Charcot in 1868 and Leber in 1869 recognized many instances of hysteric visual defects. The earliest observers associated the concentric limitation of the field with this condition, but Parinaud[1], writing forty years ago, recognized that anesthesia of the retina was not peculiar to hysteria; and was found associated with certain organic lesions, with traumatism and with poisoning.

This paper deals only with hysteric manifestations involving visual perception. There are many other manifestations: for example, hysteric spasm of accommodation and convergence, asthenopia, the ocular excursions, conjugate deviations, blepharospasm, ptosis, etc., as well as the occasional reports of conjunctivitis and keratitis produced by hysteric patients. All the manifestations described are no less important and more frequently met with than cases involving inhibition of visual function. In my experience, blepharospasm and psychic asthenopia are more common than other forms of hysteric ocular manifestations. The term "retinal anesthesia" is perhaps unfortunate; because we do not know definitely whether the process is purely psychic, or whether it alone involves the optic radiations; but practically all authorities are agreed that hysteric blindness is not a failure of the retina to perceive the images of objects, but a functional disturbance of the cortical centers.

Bernheim[2] believed visual images are perceived in a normal manner, but unconsciously suppressed, in hysteric amblyopia. Charcot did not accept this view and believed an illusion of the mind is not in a true sense an anesthesia. "Hysteria" is an unfortunate term: we should substitute for it "psychic" amaurosis and amblyopia. We are apt to think of hysteria as unrepressed expression of emotion on the part of an excitable woman, suffering from nervous shock. As a matter of fact, in the majority of hysteric amblyopics I have seen, patients have been exceedingly quiet and selfcontrolled in manner, and ocular symptoms were unattended by the usual agitative nervous manifestations.

Lancaster, in a discussion of Teal's paper before the American Academy of Ophthalmology in 1917, stated that the diagnosis of hysteria was baffling because we do not understand the nature of hysteria and recognize the fundamental fact that it is a defense reaction, taken by the nervous system to escape an "intolerable situation." In ophthalmic practice, most of us experience difficulty in analyzing the causes of hysteric amblyopia and amaurosis. But in taking histories, if we seek to determine two factors, they will nearly always be found. The first of these is the profound nervous shock, to an individual of unstable nervous makeup; the second, an intolerable situation, enhanced by autosuggestion and usually based on fear or prejudice, unhappy domestic, school, or other environment.

Given the foregoing conditions and a psychoneurotic subject, it is not more difficult to conceive hysteria as visual inhibition, than to think of any other of its bizarre manifestations.

Most of us are too well acquainted with the fact that traumatism may be followed by psychic suppression of vision without injury to the eyes themselves. When a pecuniary motive is added to other suggestive influences following traumatism and shock, the problem is complicated and diagnostic bias may be provided. This is especially true when testimony is furnished by unqualified or unscrupulous individuals. Case I is an excellent example of this type in which careless opinion is offered and served to enhance the interests of the claimant and his attorneys. It surely confuses the minds of judge and juries.

Case 1. Mr. W. H. L., age 45, married, a brakeman on the Burlington Railroad, was examined October 26 and October 30, 1920, in conjunction with Dr. W. R. Murray, for opinion relative to alleged blindness following an accident for which he asked heavy damages.

On November 29, 1919, during examination of an acetylene tank, there was an explosion sufficient to shatter the glass in the windows of the car. The car caught fire and the patient suffered a slight burn of the face which left no subsequent scars. Following the explosion of the gas tank, he claims he was unable to see well for three days, that he was never able to see well with the right eye after the injury, altho the eyes themselves were not injured by the accident. The explosion was not severe enough to knock him down or render him unconscious. He suffered no serious injury, but was badly frightened and remained away from work 19 days and then resumed his usual duties for a period of six months. Apparently, there was no damage other than the shock to the nervous system.

Previous history showed that vision in each eye was normal in 1897 and 1904 when tested for railroad employment. Examination in 1915 by the railroad surgeons showed that his vision had dropped in each eye to 15/20 which was attributed to refractive error. He was ordered up for reexamination in 1918 and 1919 and vision was found to be reduced still further to 15/30 in each eye, but this was considered good enough during those years to permit him to continue work. He began to be worried about losing his position.

About six months after the injury, he gave up work and claimed visual impairment as a result of the injury. He consulted an oculist during March, 1920, who gave him a certificate that his right eye was practically blind and that in his left eye with his corrected refraction (+1.50 S) vision was only 20/70. The certificate further set forth that he had atrophy of the optic nerve and that prognosis was grave. The reason for his blindness was given as "atrophy of the nerve caused by retinal congestion from the effect of the intense blinding light at the time of the explosion." The next remarkable document came from Missouri and showed that he had vision of 20/200 in each eye, improved in the left to 20/100 with glasses; that he had small pupils which contracted to light and accommodation, that the ophthalmoscopic examination showed excavated discs and grayish white optic nerves with the field for form contracted in each eye to the 15 degree meridian. The diagnosis was that "this patient had optic atrophy from locomotor ataxia, but the visual impairment might have been due to an injury at the base of the skull or to molecular changes." A subsequent examination was made by a physician (not a neurologist) who made the diagnosis of multiple sclerosis based on scanning speech, lateral nystagmus, optic nerve changes, exaggerated knee jerks, ankleclonus and included the statement that there was no hysteria and the case was incurable. In conversation with an oculist who examined this patient for his attorney preceding my examination, I was informed that the X-ray showed unmistakable evidence of hypophysis tumor at the base of the brain! The roentgenologist who took the picture thought the evidence might be "suggestive," but not positive of such hypophysis tumor.

At our examination, we found a well-developed, robust man of middle age, of extreme nervous manner and appearance. He was constantly nipping and squeezing the lids in a manner quite typical of hysteric blepharospasm, avoided light and wore quite dark glasses. There was no evidence of external scar or burns, inflammation of the lids or face, or any of the external ocular structures. The media were entirely normal. There were no evidences of previous iritis or other eye inflammation.

Vision in the right eye was light perception and ability to perceive objects directly in front of the eye, not laterally; in the left eye, ability to count fingers at one foot distance. The direct and indirect pupillary reactions were normal to light, accommodation and convergence; the ophthalmoscopic appearance of the retina, optic nerve and retinal circulation in each eye showed no organic abnormality. There was no cupping or pallor of the optic nerves,

the margins were clear and distinct in color, and they were in every sense normal in appearance. It was impossible to measure the fields of vision in the right eye; in the left eye, the field of vision extended outward about 20 degrees on the nasal and 15 degrees on the temporal and vertical meridians. We also convinced ourselves that a prism placed base out in front of the right eye produced lateral rotation inward. Tension in each eye was normal. Corneal and conjunctival anesthesia were present.

Examination by two competent neurologists failed to reveal any evidence of organic nervous disease, but definite areas of cutaneous anesthesia were demonstrated. Every possible test which could be used with or without the patient's cooperation was used to ascertain whether or not this man was malingering and we believed he was not. He did not show the clever differentiation between tests, made no effort to watch the proceedings carefully so as not to be caught unaware and was apparently apathetic regarding the whole examination procedure. He lacked the mental acuity to put over a good malingering proposition. One had to admit that he could see only poorly. On the basis of contracted fields, normal eyegrounds, normal pupillary reactions together with the peculiar tremulous blepharospasm, definite areas of skin anesthesia and the absence of any organic disease, the case seems clearly one to be classed as hysteric amblyopia. The nervous shock was due to the explosion months previously; the "intolerable situation" may have been the result of fear of loss of a railroad position because of inability to pass visual tests. Up until the time when the railroad paid this man $25,000 rather than take the case before a jury, the psychic inhibition was fairly complete. It has been impossible to follow the case in its subsequent history or to learn the ultimate visual outcome.

Case 2. Mr. W. H., age 21, was referred by an insurance company on May 9, 1922. On February 22, 1922, while working as a crane man in a foundry, he had an electric shock which he said blinded him slightly, but he went upon his crane again and received another shock which blinded him for eleven days. Vision in the right eye came back gradually, but in the left eye, he was unable to distinguish between light and dark. He started to work again, but quit after ten days, complaining of impairment of vision and severe pain on the left side of his face.

Personal and family history were negative excepting attacks of dizziness, vomiting, and occasional attacks when he fell down. He was of normal weight and had every appearance of health. Vision had always been good and he had normal vision in each eye on two army tests. He admitted having considerable domestic trouble, and later was divorced by his wife while still under treatment for his eyes.

The general physical examination was negative in every respect. Neurologic examination was negative, except that he showed impaired tactile and pain sensation over an area extending from the left midparietal region over the left side of face beyond and including the ear and extending downward to about the middle of the neck. It extended upward to exactly the midline where it was sharply divided. There was no evidence of any organic nervous disease.

Examination of the eyes showed vision in the right eye 20/25, unimproved with glasses. In the left eye, there was no perception of light. There was no evidence of external injury. Pupillary reactions were normal to light, accommodation and convergence. Malingering tests with the Snellen red and green letters, prisms, and many other tests were negative, nor was it possible to obtain evidence of malingering by any subterfuge. The flinch test of the left eye was negative, but in the right eye was normal when the fellow eye was covered. There was loss of left corneal and conjunctival reflexes. The fundi were negative except for a few fine choroiditic patches in each eye which could have no effect upon vision.

The fields showed typical concentric contraction in the right eye, but in no marked degree. It was considerably smaller by Forster's method than in the ordinary method of taking. There was no interlacing of color fields.

There was absolutely no objective evidence to associate the amaurosis in the left eye with any organic nervous disease. It was the opinion both of myself and Dr. E. H. Hammes, who saw him in consultation with me, that this was a case of psychic suppression of vision. Dr. Hammes believed it was possible to restore his vision by suggestive therapy which was tried in addition to treatment given by me over nearly three months, consisting principally of strychnin and digestive tonics. Dr. Hammes followed up every possible form of suggestive therapy at his command. We were unable to obtain any improvement in the vision in his case, and he was finally discharged with the recommendation that he be compensated for total loss of vision. However, about this time, his family troubles reached a crisis and his vision returned. He returned to work and completely dropped his claim for compensation.

This case is classified as typical hysteric amaurosis in one eye, undoubtedly originating in the nervous shock. The "intolerable situation" was doubtless provided by the domestic situation.

CASE 3. The following case is of interest because of the association with pseudoepilepsy, and its origin from a series of profound mental shocks.

Mr. L. N., age 21, a high school student, was referred on December 29, 1924 by Dr. Garlock of Bemidji, Minnesota, who wished confirmation of his own diagnosis of hysteric blindness. While playing in a football game, eight weeks previous, the patient got a bump on his head, was dazed and on recovery noticed that he did not see things clearly. He thinks he saw only half of objects for a short time, but is not definite about this. He believes that for a short time after the accident, there was slight loss of sensation of the tongue and face and both arms and hands, which disappeared the following day. He continued playing after a few moments and while tackling an opponent was again stunned, received a slight cut behind the left ear, was unconscious for five minutes and on re-

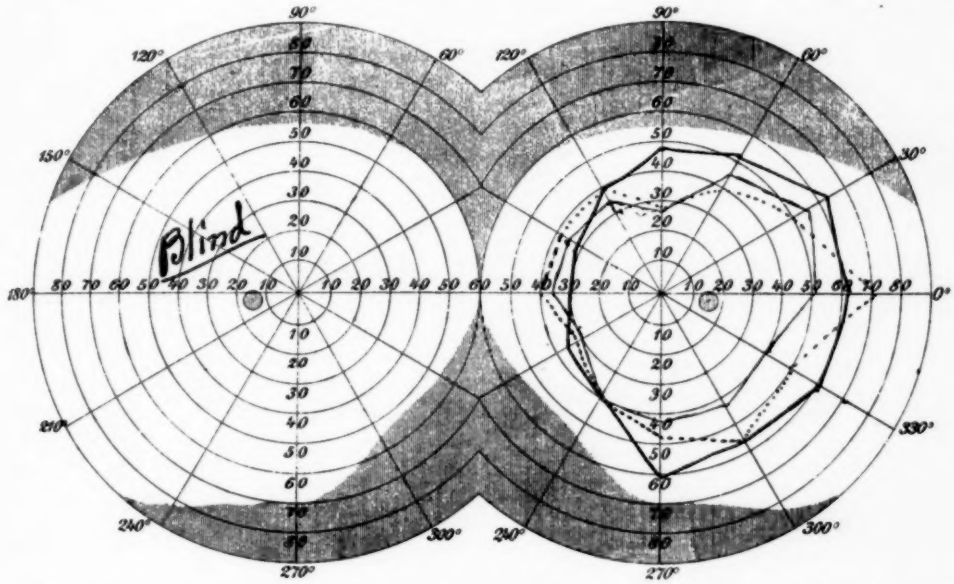

Fig. 1. Fields of Case 3. Right eye blind. Left eye: heavy outline, field for white test object. Broken line, field for blue. Light solid line field for red.

covery, was unable to see. Later in the day, he was unconscious for an indefinite period. He remembers that someone told him he was going to die and suggested sending for the priest. He was attended by a physician at once, was put to bed for a day or two and then returned home to Bemidji, Minnesota. He suffered no paralysis of any kind, there was no nausea or vomiting, no loss of bladder or bowel control; memory and speech were normal, nor were there any symptoms of skull fracture. Apparently, he had no very definite symptoms other than complete loss of vision.

Since the injury, he has complained of almost daily headaches and occasional numbness and tingling in his hands. His previous history revealed that since the age of 18 he has had occasional attacks of unconsciousness, but he never bit his tongue and never actually had convulsions. He has smoked heavily, but rarely drank. During a football game in 1921, he states that he had "concussion of the brain, and was ill three weeks with nausea, vomiting and headache." He had influenza in 1918 and smallpox in 1920, but never any other very serious illness. He had had a distinct nervous shock on two separate occasions when two brothers were killed by accident.

His father is living and well, his mother died at the age of 45 of cirrhosis of the liver. Two brothers were killed suddenly by accident. One brother died of pneumonia. Two brothers are living and well, altho one has "fainting spells" at intervals, having also suffered a great shock when one of the brothers killed accidentally, was brought to the hospital where he was working as an orderly. Three sisters are living and well.

The physical examination by Dr. Gilfilan revealed a well developed, well nourished male without any signs whatever of organic disease, and all findings were entirely negative. Blood pressure is 118/80, blood, urine, Wassermann negative.

Examination of the eyes showed no abnormality whatsoever. The fundi were normal. The pupils reacted directly and indirectly to light, the right slightly better than the left. The cornea were anesthetic, and the reflex almost absent, until the wisp of cotton fell over the pupillary area. The conjunctiva were also quite anesthetic in each eye. The flinch test was negative and there was no blinking until the eyelashes were actually touched. The eyes were parallel, stared constantly straight ahead and rotations were equal and parallel in all directions. There was no nystagmus.

Believing this to be a case of hysteric amblyopia, the patient was referred to Drs. Riggs and Hengstler, who found upon neurologic examination, in addition to the absence of corneal and conjunctival reflexes, a partial anesthesia of the pharynx. There were patchy areas of anesthesia of both thighs and legs, about the size of the palm of the hand, also areas of loss of touch and pain sensation which had a tendency to shift on reexamination. A further point of interest was the absence of bone conduction in both ears which they believe to be one of the characteristic stigmata of hysteria. The patient admitted a fixed idea that he could never see again as a result of things he had been told by a physician who had previously examined him.

The treatment instituted was hypodermic injections of strychnin 1/30 grain, three times a day, together with the use of the interrupted current daily. The patient was emphatically and repeatedly assured that he would see, that in all probability, vision would return suddenly. After a few days of treatment, he said that he definitely saw light more clearly, was able to make out position of windows which he could not do hitherto. On the morning of January 9th, I received a telephone message that the patient had awakened and when the nurse turned on an electric light, he suddenly announced that sight had returned and he could see. During the day, vision completely returned and by evening he was able to read 20/30 and J. 1 with either eye His fields of vision were taken on January 19th, ten days after the recovery of vision and show moderate contrac-

tion, concentric, more pronounced in the left eye. The anesthesia of the corneae had disappeared.

From the ophthalmic standpoint, there are certain well accepted diagnostic features of hysteric amblyopia we should be able to recognize. The essential symptoms, first of all, are visual impairment of any degree with variations in the visual fields, the concentric contraction of the visual field being most characteristic. Visual impairment may vary from moderate defects to most profound amaurosis with inability to distinguish light. The most constant factors next to those just mentioned and in reality the basis for our suspicion of hysteric amblyopia and amaurosis, are first, the absence of any ophthalmoscopic changes sufficient to explain the degree of visual impairment, and second, normal or practically normal direct and indirect pupillary reactions. These two findings together with lack of evidence of disease or injury in the eye itself, or high refractive error with congenital amblyopia which may explain lessened visual acuity, should always bring to mind the possibility of psychoneurosis. Parinaud's[3] dictum should be recalled that, "in the most pronounced cases of amaurosis the pupil reacts to light as it does not do in blindness from other causes; in other words, altho the luminous impression is not perceived, it is carried to the brain in such a way as to produce the pupillary reflex. This fact is a most important aid in the correct understanding of hysteric phenomena." It is the first aid in the exclusion of organic disease, but by no means excludes malingering in which normal pupillary reactions occur. While pupillary reactions are usually normal, they may be sluggish. There is occasional mydriasis, and occasional anisocoria.

Anomalies of accommodation are fairly frequent, according to Parinaud[4], the most frequent accompaniment of hysteric affection of the eye; this is not the case in a true amblyopia. It was a pronounced sympton in Case 4. It is the basis for the occasional occurrence of monocular polyopia and micromegalopsia. Ciliary spasm is easy of recognition with test lenses and retinoscopy under cycloplegia, disappears under the influence of atropin, but is prone to recur.

Anesthesia of the cornea and conjunctiva are common findings which should be sought for in differential diagnosis. It was present in all of my adult cases here reported. The wisp of cotton drawn over the cornea produces no corneal reflex until it just passes over the pupillary area of the cornea. Cutaneous areas of anesthesia and other evidences of hysteria are usually to be found; but for search for these we should refer these patients to the neurologists, who must also exclude organic disease of the nervous system.

The visual field is usually limited to within ten or fifteen degrees of the fixation point, and very often amounts to actual tubular fields as in Cases 5 and 6; where doubling or trebling the distance between the patient's eye and the fixation point produced no variation in the size of the field. Hysteric cases with marked contraction of the visual field seldom have perfectly normal visual acuity. One type of field which is said never to be found with hysteria is the socalled hemianopic field. Wilbrand described a socalled "oscillating field" in which the test object disappears and reappears several times, in crossing the same radius. Central scotoma may be present; and, when so, necessitates the exclusion of retrobulbar disease, disease of the posterior ethmoids and sphenoid, disseminated sclerosis, basal fracture of the optic foramina, and other conditions which produce central scotoma. It occurred in Case 5. A ring scotoma is not common, but may be one of the manifestations of hysteric amblyopia as in Case 6. De Schweinitz[5] mentions the case of a hysteric boy, in which the field showed central scotoma exactly like that caused by alcohol and tobacco. Parinaud[6] mentions a similar central scotoma occurring in a hysteric girl of twelve. One frequently finds socalled fatigue fields, in testing for concentric contraction and for this reason Forster's method is sometimes of use in making tests.

Another type of visual field, perhaps more commonly accepted as typically hysteric, is the socalled interlacing fields. Not infrequently, the red field is almost as large as that for blue, or even larger; or it may be even larger than the field for white. It perhaps cannot be accepted as characteristic and accompanies organic cerebral changes almost as it does hysteria. All in all, the concentrically contracted field is the most characteristic type. The length of time the field abnormality may persist is very variable; it may be for only a few days or for many years. Size or duration seems to have no bearing on the prognosis. The following cases in children with variations in fields are of interest.

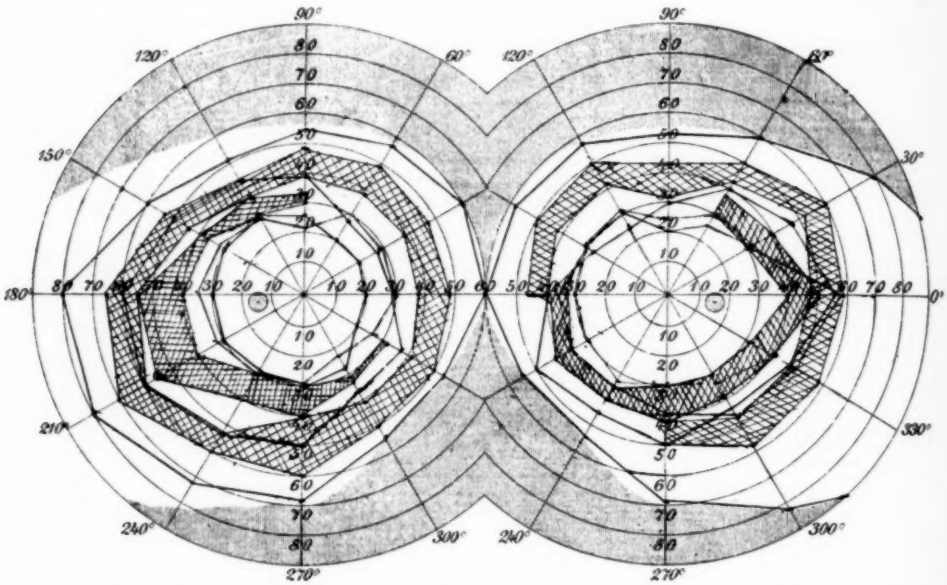

Fig. 2. Fields of Case 4, for white, blue, green and red from without inward; and ring scotomas for form and for green.

Case 4. J. H., age 13, was brought to me February 12, 1914, because the school nurse and his parents believed he did not see well. He was an adopted child, a strong, healthy lad, and complained of no subjective symptoms. He had a manifest myopic refraction which brought his vision in each eye from 20/30 to normal, but under atropin, he was found to have right and left: $+0.75\ S \supset +0.50$ c.ax. 90°. With this his vision was normal. This boy had recurrent spasm of accommodation, in spite of all of our efforts to overcome it. Even tho the eyes were given complete rest, he always reverted to spasm of accommodation. He could rarely see normally, without the aid of myopic lenses. There was no muscular imbalance, the pupillary reactions were normal, altho at times his pupils were widely dilated. Ophthalmoscopic examination showed no fundus changes in either eye. He received considerable attention at home, his foster parents read to him continuously and he was given as little school work as possible during the school year. In Oct., 1914, he could not be made to see better than right and left 20/50 with any lens given. The fields taken by Dr. John Brown showed a very interesting ring scotoma for form and green, but none for blue or red. On May 21, 1915, he reported that he could only read for a very short time; his vision was 20/60 right and left. He was taken out of school for four months, had complete rest of his eyes and wore his full correction continuously, after several variations in the prescription had been tried out with no better vision. On examination in October, 1915, his vision in each eye was

20/100; with his glasses 20/65, and no improvement with any change of refraction. He could read Jaeger 1 with either eye, only when held very closely to the eyes. Careful campimetric measurements of the fields several times showed no central scotoma. During 1915 and 1916, this boy was examined repeatedly and the best vision obtainable at any time over a period of two years was 20/50 in each eye. He never complained of headaches. He usually came in with the voluntary report, that he had no difficulty if he had to do no school work.

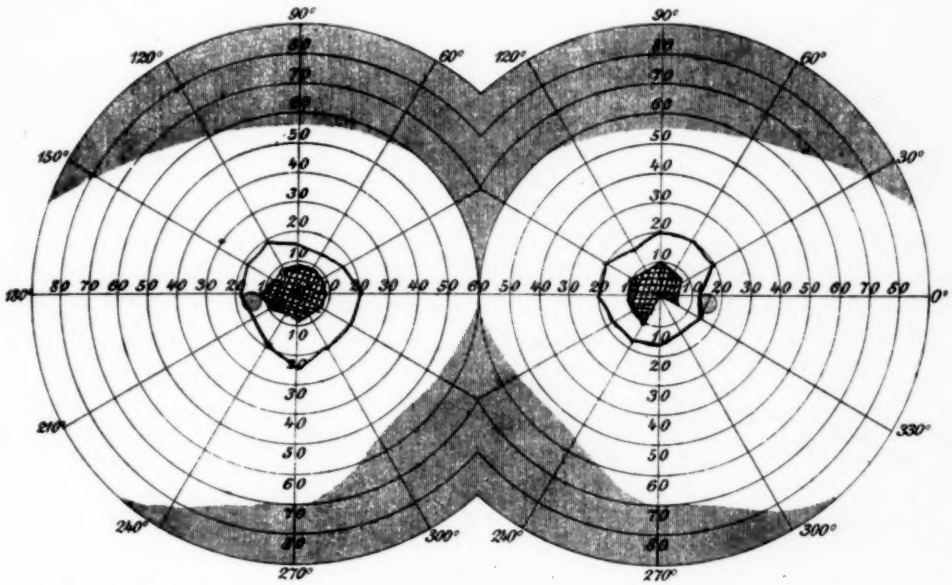

Fig. 3. Fields of Case 5. Great contraction for white and complete central scotoma in both.

A series of fields was taken by a number of observers, including Dr. John Brown, Dr. J. A. Watson of Minneapolis, Dr. Frank Knapp of Duluth and Dr. John Shellman, always showing erratic changes, moderate contraction, ring scotomata or interlacing fields, but never central scotoma even with the smallest test object.

Dr. J. A. Watson, who saw the patient on March 3, 1915, concurred in the diagnosis and wrote: "I consider the ring scotoma very characteristic, but even more than this, I would be inclined to depend upon the tendency to inversion of the color fields. On certain of my charts the red field is at least equal in extent to the blue, if not actually of greater extent, while in one, there is a marked and positive inversion of the relationship in the right eye. While I have not previously seen many cases of hysteric amblyopia, partial or complete, in which there were not other evidences of hysteria, I believe references to such cases can be found in the literature and I am inclined to accept as confirmatory evidence certain stigmata of degeneration even tho this might have no bearing on hysteria generally."

In December, 1917, school was discontinued, the boy was apprenticed to a farmer. He discarded his glasses entirely. His vision was still 20/65 with or without glasses. Subsequent history of this case is, that leading an outdoor life, with a complete diversion in work and habits and a change in environments, his eye trouble entirely disappeared. On recent examination, vision was 20/15 in each eye and the fields for form and color were entirely normal.

CASE 5. A rather interesting problem was involved in the sister of Case 4, in which it is believed that at least

in part the psychic influences of the brother's condition, together with an aversion for school work, had some influence in developing hysteric amblyopia in the sister.

R. H., age 14, a very unstable, neurasthenic girl, was brought at the same time as her brother, complaining of headaches, blurring and inability to see close work. With her brother, she was one of three children adopted by her foster parents. The mother was a very hard working woman of foreign birth, her father a disreputable, dissolute, unreliable character. There was nothing in her personal or previous history of importance. She had never been able to apply herself at school and received a good deal of tutoring and help at home in order to keep up with her classes during the lower grades. The girl was fairly developed and well nourished. The refraction was

R: +0.75 S ⌒ +0.37 C x 30° = 20/15
L: +0.75 S ⌒ +0.50 C x 150° = 20/15

A prescription was given which ended her symptoms, apparently, for about one year, when her brother was having much trouble with his eyes at school. She was again seen in February, 1915, complaining of headaches, eye pains, photophobia, inability to see. She had become quite accustomed to having her eye work done for her, altho with her glasses her vision was normal. The fields were not taken. She got along very well until school began in 1915, when she had frontal headaches. It was found that she held her book closely. She was rerefracted under cycloplegia and vision could only be brought to 20/40 in each eye. Her mother continued to do much of her school work for her and she got along fairly well until the following Autumn, 1916, when vision could only be brought up to 20/50, which was about the same as her brother's. There was no evidence in the eyes to account for this impairment, and we were very suspicious that her visual and asthenopic symptoms were hysteric.

The "defense reaction" could only be attributed to her aversion for school. In 1918, it was impossible to bring her vision above 20/100 in either eye. In February, 1919, it had dropped to 10/200. She had been told by another oculist to do very little eye work. At this time, she remarked that she could see much better some days than others. It had taken her two years to do one year's work and this only with the help of a willing roommate who copied most of her notes. She was unable to tell colors correctly. In November, 1919, her vision had dropped to R: 2/120; L: 2/200, with the fields as shown. There was marked contraction with a scotoma in the left eye, nevertheless after a period of rest with much urging, persuasion and suggestive treatment we were able to get her to read 20/50 in each eye and to read Jaeger 1.00.

There was a peculiar mental condition underlying the whole process. The girl was extremely apathetic at times, had no apparent ambition, lacked interest in most of the ordinary things and showed marked aversion for school. Still, there was no organic evidence in the fundus to account for her eye trouble, the pupillary reactions were normal, her refractive error unchanged. A careful physical examination revealed no physical basis for her condition. There was no evidence in the nose to account for the eye trouble. At each visit she was encouraged to try to use her eyes more. Her teachers were told to give her a reasonable amount of eye work. I even advised her to go to movies, to learn whether her interest could be sufficiently stimulated to make her forget her eye trouble. Her home surroundings were the finest and her foster parents were ideal, sensible people, willing to cooperate in every way when the probable nature of the trouble was explained to them.

A psychiatric examination was made on December 30, 1919, by Dr. H. L. Dealey of the University. She reported the young woman about six years retarded mentally, but found her cheerful, bright, entertaining, sympathetic, highly moral, and quite practical in work which did not involve the eyes. She discovered that the girl manifested particular interest in children. She suggested that she discontinue school

permanently and a course in children's nursing be taken up. This advice was followed with enthusiasm and success, she completed her training, became a mother's helper, and her eye troubles disappeared. In conversation with her father a few days ago, he informed me that she had been been married for the past three years, that her vision was good, and that she had no eye symptoms.

The fields which illustrate this case are the only ones I have ever seen

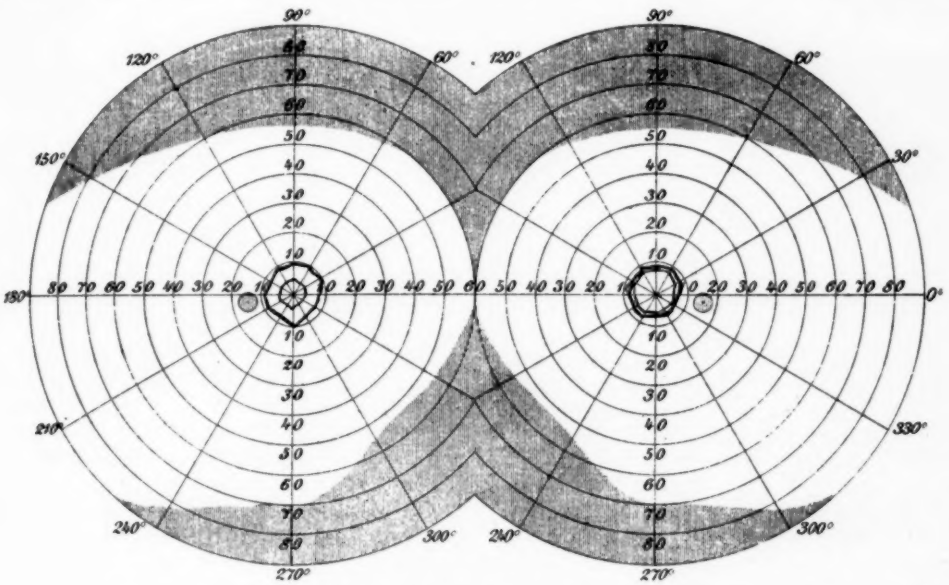

Fig. 4. Fields of Case 6 for white and red. Enormous concentric contraction.

which show marked concentric contraction and at the same time, definite central scotoma, which accounted for the very decided visual impairment. Further interest is added by the apparently happy ultimate outcome following suggestions offered by the psychiatrist, with vision ultimately returned to normal. A very recent test of vision and fields of this patient showed practically no change in refraction with vision of 20/25 in each eye. There was very slight concentric contraction of form and color fields and no scotomata whatever.

Case 6. M. K., age 11, school boy, referred December 15, 1924, by Dr. Archie McCannell of Minot, North Dakota, in consultation for an opinion as to the cause of the child's visual impairment. His personal history is without special interest. He had developed normally as an infant, had had measles, whooping cough, tonsillitis, tonsils had been removed. He had been extremely irritable since about seven years of age, was decidedly neurotic, and complained of headache and inability to read.

The father is a very nervous man and entirely blind in one eye. He is much devoted to the boy, and enjoys helping him with his lessons and reading to him almost constantly. Every time the boy complained of a headache or trouble with his eyes, the father would do his reading for him. The mother is quite nervous, rather indulges the boy and does a good deal for him, so that the child accepts practically no responsibility. The boy himself was extremely nervous and fidgety, moving about all the time, putting one leg over the edge of the chair, walking about the room. He had frequently heard his mother remonstrate with his father about his reading and tell the father he would dim the vision of his remaining eye, or lose his sight altogether

if he did not give his eye more rest. Moreover, the patient has a cousin with poor vision which has been much discussed in the family. The boy had not progressed well in school and because of this felt quite inferior to other boys. As a result, he relied more and more on his father and got him to read to him and to do things for him, because he found complaint about his eyes gained him attention.

Examination found vision in each eye 20/65, unimproved by glasses. Retinoscopy by two of us showed:

R: +1.00 S = 20/65;
L: +1.25 S = 20/65.

The pupillary reactions were active and normal and the fundi were normal in every respect. Examination of the fields of vision showed a very marked contraction with the fields for form entirely within the ten degree circle in each eye. The field for red and blue in the left eye was contracted down to about three degrees of the point of fixation, but in the right eye, the field for blue and red conformed almost exactly to the field for form. Retest on the tangent curtain showed practically no variation in the size of the field, whether taken at one foot or one meter, thus constituting quite typical tubular fields.

Thoro physical examination by Drs. Christison and Colby showed no physical defect except exaggerated knee reflexes. The child was physically well developed. There was no evidence of any organic cerebral condition or nervous disorder.

Because of the peculiar findings in this case, the patient was referred to Dr. Smiley Blanton of the Child Guidance Clinic with our findings, and the opinion that this seemed an undoubted case of hysteric amblyopia. He elicited the facts regarding the family and personal history as given, much of which had been overlooked by us.

The psychologic tests showed the boy had an intellectual quotient of 110 according to the B and A test. The Maize test, to test the boy's capacity to plan his moves ahead of time, and his poise, showed that he had an intelligence quotient of only 85. The performance showed an intelligence quotient of 100. The psychologic test showed that the boy was extremely suggestible, erratic and impulsive. As soon as he struck a hard problem, he gave up almost at once. On the whole, the test showed that the boy was very infantile, suggestible and lacking in poise. These emotional factors gave the boy a much lower rating than his general intelligence would warrant.

Dr. Blanton's recommendations in regard to treatment were as follows: "There is nothing specific that we could do for the hysteric symptoms at this time, but one must try to gradually retrain the boy so that he becomes less dependent and more able to win success in ordinary competition with boys of his own age. When he is able to find an outlet for his energy, in a normal way, this hysteric condition, which is a bid for unwholesome attention, will disappear."

He suggested that the father let the boy take care of his school work himself and not help him with his studies at all. If he got his problems wrong, he should fight it out with the teacher. That no mention be made of his poor eyesight and headaches; when they occurred to allow the boy to go to bed, but not to allow him to gain anything thru these symptoms; that the father should never read to him because of the poor eyesight complaint or headaches. He suggested that the boy join other groups for skating, football and other athletics; that he be forced, if necessary, to play with other boys and not with his sister, or stay at home and be read to by his father. He wrote "The boy must be trained to use his intellectual powers more adequately; the impulsive, erratic, distractible tension which he has must be trained; the teacher ought to exercise patience and insist that the boy do a little better as time passed. If the boy becomes emotional, he must be reeducated so that he can use his intellectual powers to their fullest." It was his opinion that if this were done, he would entirely recover.

COMMENT. It has been frequently noticed that patients with markedly contracted or tubular fields, in hysteric amblyopia, have only moderate difficulty in orientation. One explanation for this fact is that even tho peripheral vision is completely abolished, peripheral reflexes, altho unperceived, bring about in the muscular apparatus instinctive and unconscious movement by which good orientation is possible.

In certain incomplete monocular amaurotics, effort at binocular vision is made when a weak prism is placed in front of the blind eye. Because certain patients respond to this test used for malingering, they have sometimes been characterized as cheats. According to many authorities, this effort at parallelism of the two eyes does not exclude hysteria. The explanation for its occurrence may be based upon unconscious response of the convergence center to unperceived visual reflexes.

We are compelled to accept a diagnosis of hysteria in the absence of organic, ocular and nervous disease and inability to detect definite evidence of malingering, especially if other evidences of hysteria are proven, provided the symptom complex comprises entirely functional characteristics of the certain types just described. But one must not lose sight of the fact that the clinical picture may embrace organic disease, to which is superadded the manifestations of hysteria. In such cases, the hysteric element is more apt to be overlooked than in the purely amblyopic and amaurotic types. On the other hand, the error may be made of mistaking hysteric ambloypia for organic disease, or of too quickly attributing it to malingering.

As Jackson[7] says, blindness of hysteria has "generally been thought of as closely allied to malingering and differential diagnosis is difficult, while it is easy to suppose that they arise from similar causes. But they are separated by the wide gap that lies between consciousness and unconsciousness. The malingerer is conscious that he can see, the hysteric is not." When malingering is monocular the diplopia tests, Snellen's colored glasses and letters, Todd's amblyopscope test, Jackson's neutralizing cylinders and Jackson's prism test will usually reveal its true nature. If bilateral as it less frequently is, the absence of other hysteric manifestations, the ability to catch the patient off his guard (as in the flinch test), and sometimes clever detective work by interested parties after the patient leaves the office, are distinct aids. There is a distinct difference in the attitude, manner, bearing and especially the gait, as between true blindness, psychic amaurosis and malingering.

A totally blind patient walks with a hesitating step, expressionless face, and a dull stare. The eyes are often not parallel. The malingerer can not simulate the same gait and often exaggerates his efforts at groping. The malingerer will often look in every direction, but toward his hand if told to look at his hand placed in front of him.

Aside from the purely ocular examination, especially when traumatism plays a part and if a legal phase is involved, a careful personal history of the individual must be obtained. His inherited tendencies, details of his personal life and habits, the occurrence of some profound mental shock, the influence of environment, suggestion, motive, and positive causes for the socalled defense reaction tend to confirm the suspicion which the negative eye findings have created in our minds. All of this demands much more of the oculist's time than the eye examination itself, but is essential in differential diagnosis.

What has been said in regard to obtaining careful histories, in connection with differential diagnosis, applies with equal importance to treatment. The history usually reveals reasons why the psychasthenic patient seeks visual defense from disagreeable conditions in life. It may reveal some fear, based on suggestion, under which the patient labors. This is illustrated in a case reported by Moore[8] in which the patient had acquired the idea that atropin used for examination had injured the sight so that he wore dark

glasses continuously, remained in a dark room for ten months and travelled forty mile with a shawl over his head, to see a doctor and immediately recovered vision after canthoplasty under ether.

A thoro knowledge of human nature is demanded; and the confidence of the patient, and in the case of a child, of his or her parents, must be obtained. It is desirable that treatment should be free from the meddlesome interference of anxious relatives. Often without complete change of environment nothing can be attained. Exhaustive psychoanalysis is usually entirely beyond the skill of the average ophthalmologist, and success is best attained by referring these patients to a trained psychiatrist, who is able to carry out the proper line of suggestive psychic therapy. It is desirable to avoid the error which many of us make of telling the patient that there is nothing the matter with his eyes. More progress is made by emphatically, repeatedly affirming that there is something the matter, that the cause of the trouble has been found and that the remedy is at hand. This was probably the secret of success in Case 3. De Schweinitz[9] strongly urges before any prolonged rest cures are instituted, that the most painstaking examination of the eyes be made. He believes eyestrain itself may be responsible for many cases of hysteria, not only in the eyes, but in other organs or regions, including even hysteroepilepsy. While not the case in normal individuals of sound constitution, it may be true in one of neuropathic tendency. The refraction should be thoroly worked out under cycloplegia and the muscle balance considered in every possible phase, especially for convergence insufficiency and hyperphoria. In children in whom amblyopia is associated with accommodative spasm, the use of atropin over a considerable period is indicated, for while the spasm will disappear under cycloplegia, it frequently reappears and requires further treatment.

Just as amaurosis and amblyopia are frequently produced by sudden shock, vision may be restored by sudden shock. Moore[10] reports a case entirely restored by electric shock and two others in whom sight returned while awaking from narcosis. Electricity as a means of suggestion still remains perhaps one of our best aids. Strychnin hypodermics have been much used. Practically all cases recover vision sooner or later. In a case cited by Harlan[11], the hysteric blindness persisted ten years in a healthy male subject, and vision was completely restored and maintained. Many of these cases are cured by the side-shows to medicine, such as hypnotism, Schlotterism, spiritualism, Christian Science, or by visits to such shrines as Our Lady of Lourdes, St. Anne de Beaupre, etc. While all cures are based on suggestion and profound faith, there must be created in the mind of the individual an equally profound desire to regain vision. As someone has aptly said, "In order to see, it is necessary to look."

Hamm Building.

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MEDULLATED NERVE FIBERS INVOLVING THE MACULA.

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In each of the two cases here reported the affected eye was highly myopic and central vision very poor. The fellow eye was slightly hyperopic with good vision. The fields of vision were greatly narrowed in the affected eyes and normal in their fellows. The first case was presented at the Colorado Ophthalmological Society, December, 1924. The paper was read before the American Ophthalmological Society, May, 1925.

The unusual location even more than the great extent of the opaque nerve fibers has led the writer to record this case, with the aid of a sketch which Dr. W. C. Bane has most kindly and accurately drawn, and a field taken several times by Lloyd's stereo-campimeter with Dr. D. A. Strickler's assistance.

Visual examination by the school authorities had found the sight of the left eye of this boy of 6½ years, markedly defective. Examination by the writer showed L. E., V = fingers eccentrically; refraction, 18.00 D. of myopia: R. E., V. = 5/4, with 0.50 D. of hyperopia, and a normal fundus.

At three years the patient had acute suppurative otitis media of the left ear. After one or two months the parents noticed that the left eye diverged when the child was tired. When under cycloplegia this eye showed marked convergent squint, but moderate convergent strabismus was generally observed.

The upper incisors were decayed to the roots, the boy was underweight, and had adenoids and hypertrophied tonsils that were soon to be removed. Altho rather delicate he was fairly well, active and of a studious mind.

Both the child's mother and sister have an amblyopic eye, but no opaque nerve fibers or other ocular anomaly.

With the ophthalmoscope the medullated nerve fibers were seen to overlap the entire periphery of the optic disc, causing the central vessels to appear as if at the bottom of a cup. The area of opacity also completely surrounded the disc, extending from 1½ to 4½ disc diameters from it without interruption, and covering the macula. A striking V-shaped sector of clear retina showed below the macula.

As the opaque fibers are rather thin over the macula, and therefore would permit a measurable degree of sight, it seems probable that the loss of central vision and fixation in the left eye may be due either to nondifferentiation of the macula or to amblyopia ex anopsia. The former explanation could be supported by the inference that an eye with so marked an anomaly of the medullary sheaths of the nerve fibers might well show defective development in other tissues of the eye as, for example the central macular region of the retina. Eighteen diopters of myopia in this eye as compared with one half diopter of hyperopia in the other would account for amblyopia from disuse.

The field of vision indicates lack of development of almost the entire retina, as the only part of the field showing vision was an area measuring 15° in the vertical, and 20° in the horizontal meridian, in the peripheral portion of the lower temporal quadrant. The smallest test object that could be seen was 4° in diameter, and it was readily perceived in white, blue, red and green. It seems remarkable that the island of clear retina below the macula should show no response whatever in taking the field of vision; also that the periphery of the retina, which looked normal, should be almost devoid of sight.

Dr. Edward Jackson has courteously furnished the following notes of a case of his that shows a striking resemblance to the one herewith reported by the writer.

A. G. R., aged 35, a scientific instrument maker, in good general health, came Dec. 7, 1912, complaining of difficulty with reading. R. had poor vision and turned out, from early childhood. It had turned more of late, and it was more prominent than L. Vision, R. = 2/100, improved by —12.⌒—1. cy. ax. 150°, to 1/40. L.,

+0.25⌒—0.25 cy. ax. 175° V. = 4/3 mostly. He was given, for near work, R. —1. cyl. ax. 150°, L., +1. sph. ⌒ —0.25 cy. ax. 175°; which he is still using, altho recently having a little trouble about reading with them.

He was reexamined April 8, 1925, and the conditions previously observed were found unchanged. Vision, R. made out. The large retinal vessels of this region, some places, lie entirely on the surface of the opaque layer, and in others are entirely buried and hidden in it. In attempting to fix with this eye, the patient uses a part of the retina to the nasal side of the optic disc, and slightly below the level of its center.

He sees with his right eye only in

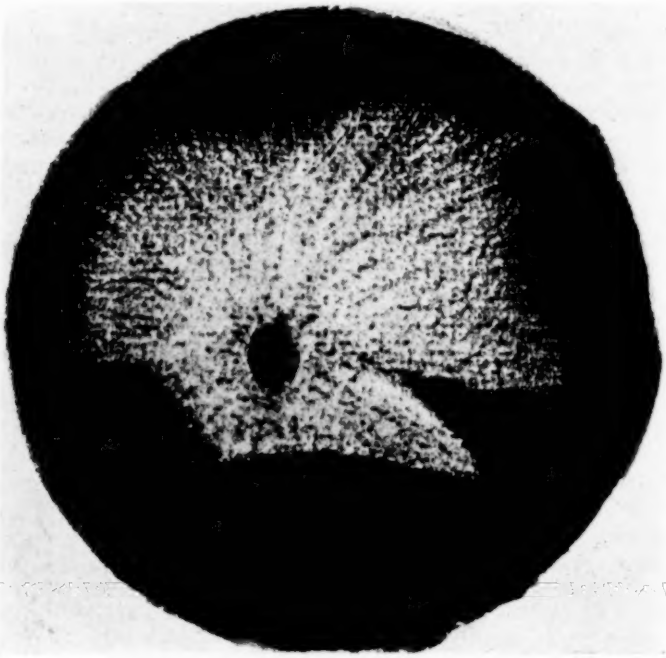

Fig. 1. Appearance of fundus in Libby's case of medullated nerve fibers involving the macula.

1/60, diverged 80 centrads. Ophthalmoscope: Media clear, color of discs and general fundus normal, in both. Right: Presents patch of opaque nerve fibers, extending from 2 disc diameters to the nasal side of the disc, to 2 or 2½ disc diameters to the temporal side of the fovea; chiefly above, but almost surrounding the disc, and covering almost the upper half of the macula. In the macular region the edge of the patch "feathers" out, as if the course of the fibers is directly across the macula; or rather there is no anatomic macula, but in its place the nerve fibers pass across toward the temporal region, and nothing like a fovea can be

his temporal field. But when driving he does not notice an automobile in the part of his field that is not included with his left eye, unless he consciously fixes attention with the right eye, covering the left.

The writer of this paper is pleased to be able to report two cases which he considers unique in their extensive involvement of the macula, which seems to enjoy immunity from areas of medullated nerve fibers, as a rule. No available ophthalmic literature showed a case in which the macula was covered.

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OCULAR EFFECTS OF LIPIN-PROTEIN AND DEFATTED TUBERCLE BACILLI INJECTED INTO COMMON CAROTID ARTERY OF RABBITS.

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Four substances were used for experiment. A. The residue obtained by extraction with alcohol as detailed. B. A residue obtained by extraction with petroleum ether. C. Residue obtained with petroleum ether from bacilli treated with hydrochloric acid. D. Residue remaining after extraction of C. With B and C typical tubercles were produced. D proved extremely toxic, rapidly causing death in most rabbits. In some that survived violent inflammatory reaction occurred in the eye in no way resembling tuberculosis. Candidate's Thesis for the degree of Oph. D. in University of Colorado.

Because of the regularity of occurrence and characteristic appearance of the various lesions of ocular tuberculosis produced by Finnoff[1] with dead bovine tubercle bacilli, we thought by an additional step, to isolate some particular extractive of the tubercle bacillus, which upon injection might produce lesions resembling those of dead bacilli.

After a study of the literature on the chemistry of the tubercle bacillus it was evident; that the nature of the chemical components of this organism, in so far as their specificity is concerned, is an uncertainty. We confined ourselves to the injection of lipin-protein and defatted tubercle bacilli of the bovine type extracted after the method of Long[2]. The term lipin-protein, as indicated by Long[2] means "an intimate union of fatty substances and protein, without commission to the idea that the union is necessarily a chemical one. The term is meant to cover those protein-lipin combinations or mixtures from which the lipin may be extracted only with difficulty."

The method of extraction was as follows:

(1) Dead moist bovine tubercle bacilli were washed repeatedly in normal saline solution until the supernatant fluid was entirely clear.

(2) The bacilli were then treated with cold 95 per cent alcohol for 24 hours, and were thoroly shaken at intervals.

(3) Bacilli were extracted continuously for 8 hours by the condensation drop method, in a large thimble filter with hot absolute alcohol. The alcohol was then filtered thru a heavy filter thimble and evaporated to dryness. This residue is designated A.

(4) Bacilli extracted with hot petroleum ether, boiling point 40-60 degrees C. as in (3), continuously for 8 hours. The petroleum ether filtered and evaporated to dryness. This residue is designated B.

(5) Bacilli treated with normal hydrochloric acid for 48 hours at 37 degrees C.; washed thoroly with distilled water and dehydrated with 95 per cent and absolute alcohols.

(6) Bacilli again extracted continuously for 8 hours with hot petroleum ether as above (3), and the petroleum ether evaporated. This residue is designated C.

(7) This is the end product namely the defatted tubercle bacilli, and is designated D.

Prior to this method of extraction by Long no investigator had treated tubercle bacilli in the extraction of their lipin content with normal hydrochloric acid. Long has shown that, "Bacilli of the acid-fast group which have been defatted as thoroly as possible with alcohol and petroleum ether, and from which 20-35 per cent of the dry weight has been removed in material soluble in petroleum ether, remain morphologically intact and acid-fast. Such bacilli still contain from 1-8 per cent of the dry weight in the form of lipin firmly bound to protein in a union, chemical or physical, of such sort that extraction with fat solvents is impossible . . . . The lipin may be released and rendered extractable in petroleum ether by 48 hours' treatment of the once defatted bacilli with normal hydrochloric acid.

Simultaneously, the integrity of the bacterial cell and its acid-fastness disappear. The lipin, removable after the acid treatment, appears to be the same in the case of all microorganisms examined; namely, tubercle bacilli of the human, bovine and avian types, leprosy bacilli and frog, turtle, grass and smegma bacilli, and B. subtilis. It has the same characteristics as the wax, more easily isolated from the tubercle bacillus, and is probably a mixture containing the mykol of Tamura and mykol laurate."

From the foregoing the nature of the lipin-protein residues A, B and C, is defined, in so far as it is possible to define it. The end product, residue D, is the defatted tubercle bacilli, which in the process of extraction have lost, in addition to their lipins, their acid-fast properties and cell identity.

The following conditions prevailed in carrying on this work:

Only rabbits with normal fundi were injected. The injections were all made into the common carotid artery on one side. Ether anesthesia was used and aseptic technic carried out.

Prior to enucleation of eyes for sectioning, the animals were killed in an illuminating gas chamber. The eyes were enucleated immediately after death and fixed in Zenker's solution. Sectioning of the eyes was done by the dry celloidin method of Lee.[3] Serial sections were cut in each instance, and were stained with hemotoxylin and eosin and mounted in balsam.

To demonstrate with the aid of the ophthalmoscope the localization, in the intraocular vascular system, of the various residues and defatted tubercle bacilli when injected, the following procedure was adopted. A carbon suspension of moderately coarse particles was made. Three cc. of this carbon suspension was injected into the common carotid artery of six rabbits. In only one of these animals was it possible to demonstrate with the ophthalmoscope the presence of carbon particles. These particles presented as very small irregular shaped patches, spread diffusely thruout the fundus, and apparently lodged in the choriocapillaris. The eye of one of the negative animals was sectioned and examined histologically. No particles of carbon were seen. Specimen Q 10.

This small series of injections with a suspension of carbon gives an indication, at least, as to the degree of uncertainty with which various suspensions take root, and their onward passage in the capillaries permanently obstructed.

INJECTIONS WITH RESIDUE A.

With residue A, lipins extracted with hot absolute alcohol, twelve rabbits were injected. After complete drying this material was a dark brown solid, with an odor of chocolate, resembling very much in its consistency a poor grade of beeswax. A suspension was made of this substance in sterile normal salt solution, in the proportion of 10 mg. to 1 cc. Each animal received in the common carotid artery 2 cc. of the suspension. At the time of injection the animals manifested no ill effects. The eyes were examined over a period of two months and in all, except one, there were no lesions discernible. The rabbits were healthy and gained weight thruout the period of observation. The cornea of this one animal, eleven days after inoculation became hazy, the aqueous turbid and the iris thickened and congested. An obscured view of the fundus was negative. This appearance continued for about six weeks, tho the media cleared somewhat, still no fundus detail could be made out. The animal was gassed three months after injection and the eye showed the following histopathology. The iris and ciliary body are markedly edematous and both evidence necrosis of their vessel walls with resultant hemorrhage; anterior chamber filled with polymorphonuclear leucocytes, fibrin and a few red blood cells; choroidal vessels extremely congested and some of them disintegrated so that the stroma of the choroid is invaded with red and white blood cells; edema of the retina marked; pigmented epithelium normal.

INJECTIONS WITH RESIDUE B.

With residue B, lipins extracted with petroleum ether, twenty-two rabbits were injected. This material was colorless and brittle, and on being removed from the evaporating dish broke up into fine scales. A suspension was made of this extract in sterile 6 per cent acacia solution, in the proportion of 14 mg. to 1 cc. Each animal was given 3 cc. of this suspension. At the time of injection one animal died on the table, six others died within a period varying from 24 hours to three days. It is apparent from this mortality rate that this extract was more toxic than residue A. None of these animals showed any ocular lesions. Of the remaining fifteen animals, two were negative over a period of observation of ten weeks, but the other thirteen showed a type of lesion the essential characteristics of which were uniform. The time of appearance varied from 24 hours to one week, but in the early manifestations the changes were so slight that we were frequently in doubt as to the presence or absence of any pathology in the fundus. However, further observations over a longer period of time substantiated our previous suspicion. A case history in detail will convey the changes as they occurred in this series of animals.

Twenty-four hours after injection there was a faint suggestion of beginning ridged iritis; the media were clear; above and below the nervehead just posterior to the median line a faint grayish area of infiltrate into the choroid. Posterior to the lower area of infiltration is an oval pearly white detachment of the retina.

One week after injection: No evidence of ridge iritis, media clear; areas of infiltrate more pronounced with some swelling; two small pearl gray areas appearing in the area of lower infiltrate and another patch of the same character in the fundus below.

Two weeks after injection: Three small areas described are yellowish in color, and numerous small areas of a similar character are seen well forward; the two large areas of infiltrate have a peculiar metallic luster; iris diffusely thickened; no evidence of retinal detachment.

Three weeks after injection: General appearance of fundus unchanged.

Five weeks after injection: Media clear; patches in choroid more atrophic with pigment showing thru them, and the choroidal vessels more visible in these areas; diffuse areas of infiltrate unchanged.

Six weeks after injection: The numerous small round areas forward show a more yellow center; diffuse pigment changes thruout this entire region.

Seven weeks after injection: Lesions going toward cicatrization with pigment beginning to collect at their margins.

Nine weeks after injection: Three radiating exudates into the anterior chamber above, with posterior synechiae and circumcorneal injection; the number of small yellow patches in the choroid increasing in number.

Eleven weeks after injection: Iris stroma and chromatophores thinning in upper quadrant of iris; several new exudates on anterior lens capsule; diffuse areas of infiltrate unchanged.

Twelve weeks after injection: Iris more atrophic; spots in fundus are brilliant yellow; pigment changes about their edges slight.

Fifteen weeks after injection: Fundus picture unchanged. The two large irregular shaped areas of diffuse infiltrate are apparently at a stand still; iris distinctly atrophic above.

Twenty weeks after injection: No further appreciable changes were evidenced.

From this group, five eyes which showed macroscopic lesions were chosen for section. Four of these specimens were enucleated from two months to five months after injection and all showed a strikingly similar histologic picture. The fifth was enucleated two days after injection, and its histopathology was quite different from the other four. Specimens R-8, E-2, Q-2 and J-2 exhibited definite epithelioid tubercles, and R-8 giant cells in addition. All of these lesions were confined to the uveal tract, and

in examination of the several slides tubercles were found in the iris, ciliary body and choroid. These tubercles consisted of small round cells, epithelioid cells and plasma cells, and in R-8 giant cells with peripheral arrangement of their nuclei. There was no evidence of caseation in any slide. The pigment epithelium over these areas of infiltration was disturbed in a slight degree, and in general the migration of the pigment was slight. The retina thruout was practically unaltered.

Specimen M-8 from the animal dying two days after injection showed the corneal stroma edematous; marked infiltration of episcleral tissue with small round cells; fibrinous thrombi in many vessels of the iris and choroid and the stroma of these two structures moderately infiltrated with small round cells; ciliary processes markedly congested with degeneration of their epithelial coverings and the migration of pigment into the posterior chamber.

INJECTION WITH RESIDUE C.

With residue C, lipins extracted with petroleum ether after treatment of the bacilli with normal hydrochloric acid, twelve animals were injected. The physical characteristics of this extract differed in no way from those of residue B. A suspension was made of this extract in sterile 6% acacia solution in the proportion of 1 mg. to 1 cc. Each animal was injected with 3 cc. We reduced the amount of extract injected with the idea of diminishing the number of casualties within the first several days following the injection. At the time of inoculation the animals manifested no ill effects. During an observation period of seven weeks, the rabbits were healthy and gained in weight. No ocular lesions were seen. Our inference was that either the dosage had been too small or that this residue was innocuous; however, histologic examination of three eyes of this group proved the contrary. Each specimen examined, namely, M-2, X-2 and C-3, showed typical epithelioid tubercles. In specimen C-3 a characteristic iris tubercle, exhibiting giant cells with peripherally arranged nuclei, was studied. That these areas of infiltrate were not seen ophthalmoscopically is explained by the unaltered pigment epithelium subjacent to them, and in the case of the iris by the intact anterior border layer. These lesions were confined to the uveal tract. The retina and all other structures were normal. There was no evidence of caseation.

INJECTIONS WITH RESIDUE D.

With residue D, the defatted tubercle bacilli, the end product after all extractions had been made, 28 rabbits were injected. This material was a light brown, of the consistency of a fine grade of sand, slightly gritty to the touch but easily powdered between the thumb and forefinger. A suspension of this substance was made in sterile physiologic salt solution, in the proportion of 3.5 mg. to 1 cc. Each animal received 3 cc.

The immediate effects were severe; 8 animals died on the table within a few minutes after injection. These rabbits were seized with a series of clonic convulsions followed by tonic convulsions, opisthotonos and respiratory failure. Another animal died half an hour after injection, five more within 24 hours, and one each on the fourth, fifth and seventh days respectively. All of these animals were acutely ill from the time of their recovery from the ether until death. The casualties encountered in this series from the immediate effects of injection may have been due to embolism, or to the toxicity of the injected material. The cause of death was not determined by autopsy as we were interested at the time only in ocular effects. We are of the opinion, however, that the virulent effects from the injection of residue D is the result of a toxic phenomenon, because, during the last three years, we have injected more than 300 rabbits with suspensions of living and dead tubercle bacilli, grass bacilli, butter bacilli, Koch-Novy bacilli, lipin-proteins, etc., and we encountered no such immediate ill effects as met with in this series.

Eleven animals rallied sufficiently from the initial ill effects of the injection to be observed over varying periods of time. Six of these rabbits showed no ocular lesions macroscopically nor with the ophthalmoscope. Five eyes showed pathology, the clinical appearances and changes in one of which will be described in detail.

Animal Z-8. The day following injection there was an acute conjunctivitis; the cornea markedly hazy and no fundus reflex obtainable.

Three days after injection: The lids were sealed and upon separating them there was a profuse discharge of thick cream colored pus; cornea diffusely hazy with a paracentral zone of infiltrate of a denser character; a 2 mm. pericorneal zone of vessels invading the cornea.

One week after injection: Severe conjunctivitis; corneal infiltrate more dense.

Three weeks after injection: Cornea clearing.

Five weeks after injection: Cornea fairly clear and slightly vascular; leucoma adherens below; pupil widely dilated; lens cataractous; between ten and twelve o'clock a yellowish exudate on the anterior lens capsule.

Eight weeks after injection: Cornea clearer; lens occupied by a yellowish mass; iris still in contact with cornea below.

Ten weeks after injection: Eye atrophic; cornea about one-half its normal size.

Thirteen weeks after injection: Animal gassed for specimen.

Five eyes of this group, Z-8, A-9, B-9, E-9 and W-9, were sectioned and studied histologically.

Histopathology of Z-8 gassed 13 weeks after injection. A generalized edema of corneal stroma; cloudy swelling of the fixed corneal cells and complete degeneration of many of them; middle layer of stroma invaded by new formed blood vessels and numerous plasma cells containing Russel bodies in their protoplasm. Bowman's membrane hard to identify because of edema and degeneration. Descemet's membrane thrown into folds and the endothelium on its posterior surface has disappeared in many places. Near the angle of the anterior chamber the posterior surface of the cornea is covered with endothelial cells, containing pigment granules in their protoplasm, and degenerated pigmented epithelial cells from the iris. The anterior chamber is almost obliterated and what remains is filled with serous exudate.

The iris is in an extreme state of edema, the chromatophores show cloudy swelling and degeneration and disintegration of their pigment. The pigmented epithelium of the iris has undergone complete degeneration. The posterior chamber is completely filled with a dense blue staining exudate of degenerated white blood cells and disintegrated lens fibers. The lens capsule is degenerated and broken in many places and what remains is thrown into folds. The cortical fibers are broken up and scattered thru the posterior chamber, and the cortical fibers of the posterior lens have undergone marked morgagnic change. The ciliary body shows marked degenerative changes, and the pigmented epithelium is disintegrated. No sign of the ciliary processes remains. The choroid shows moderate edema; the blood vessels are markedly engorged, and the stroma infiltrated with plasma cells. The pigmented layer of epithelium is in a fair state of preservation and in a few areas shows proliferation under the retina. The inner layers of the retina are edematous and show several hemorrhages into the inner nuclear layer; the layer of rods and cones shows slight evidence of edema and degeneration.

Histopathology of A-9, which died two weeks after injection. The central area of the cornea is necrotic and there are three oval dark stained masses similar to those seen in desiccated lagophthalmic ulcers; the posterior surface is free of endothelium; near the periphery is an infiltrate which consists chiefly of polymorphonuclear leucocytes, some small round cells and a few plasma cells. The iris is edematous, the vessels congested and the stroma infiltrated with polymorphonuclear leucocytes and lymphocytes.

The pigmented epithelium has practically disappeared and what remains is markedly degenerated and evidences no cell detail.

Histopathology of B-9, which died 30 minutes after injection. Several vessels of the iris, choroid and ciliary body showed the presence of a red staining material in their lumina, emboli formed by the injected material. There is an antimortem retinal detachment over a large area. A small amount of fibrin in the anterior chamber.

E-9 died four days after injection. This eye showed no lesions macroscopically or microscopically.

W-9 was gassed 18 weeks after injection. Histologic examination negative.

SUMMARY.

1. Certain lipin-proteins, namely, those extracted from tubercle bacilli with petroleum ether, and those extracted with the same solvent after treatment of the bacilli with normal hydrochloric acid, may produce epithelioid tubercles; either with or without giant cell formation.

2. Lipins extracted from tubercle bacilli with absolute alcohol were inert in 11 of the 12 animals injected. The other animal J-8, showed intraocular pathology, but the histologic appearance of these lesions in no way resembled those changes induced by the tubercle bacillus.

3. With the defatted tubercle bacilli we did not produce any lesions which resembled those which have been produced in this laboratory by the injection of dead tubercle bacilli. As Long has shown, residue D is a substance which has been decidedly altered in its physical and staining properties. In addition there can be no doubt, that some change in its molecular structure has occurred. This change has altered its ability to excite ocular pathology which in any way resembles ocular tuberculosis, in any of its various manifestations.

I wish to acknowledge my appreciation for the assistance rendered me by Dr. William C. Finnoff, and for the suggestions of Dr. H. J. Corper, Director of the Research Department of the National Jewish Hospital at Denver, where this work was done.

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UVEITIS, ITS DIAGNOSIS, ETIOLOGY AND TREATMENT. AN ILLUSTRATIVE CASE.

ALAN C. WOODS, M. D.

BALTIMORE, MD.

This is the report of a typical illustrative case in which the ocular examination was supplemented by the general examination of a physician, a rhinologist and laboratory examinations of the blood. The lines of treatment thus indicated were followed including protein therapy with dead typhoid bacilli, the vision and usefulness of the eye being largely recovered.

W. F. McC., age 59, was seen June 15, 1923. Right cataract, iritis, old. Left acute iritis. Diabetes, systemic treatment, local treatment, nonspecific protein therapy.

Complaint: Loss of vision in right eye, sore left eye. Diabetes, sore on toe.

History: Father died at 82 years, blind. Mother died of cancer. Five brothers and sisters living and well. Two bothers dead, one from heart trouble; one from weak lungs. No history of diabetes or tuberculosis in family. No malignant disease other than in mother.

General health has been good, usual diseases of childhood. Possible malaria in 1880. Pneumonia in 1913. For other facts pertaining to personal history see present illness.

Present illness: Started about 1917 with numbness of the legs. In 1919 developed sores and blisters on left foot. Was in bed four months. These sores have been recurring off and on ever since. The patient has noticed that vision has been failing. About six weeks ago vision in the right eye became very much worse. The eye became inflamed and very painful. Was in a darkened room for four weeks and then discovered one morning that the vision in the right eye was completely gone. About two weeks ago the left eye began to be somewhat painful and became inflamed. Six years ago the patient noticed the volume of urine was increased with nycturia, at least every hour. This frequency has remained.

Examination: The right eye shows a very small pericorneal congestion, a small, slightly irregular pupil, not reacting to light. There is no ciliary tenderness. Tension in the eye is normal to fingers. Ophthalmoscopic examination shows complete absence of the red reflex. The lens is cataractous, slight iridic shadow is seen at periphery. Centrally there is a heavy subcapsular opacity. The left eye is violently inflamed. The congestion is chiefly circumcorneal. There is marked ciliary tenderness, the pupil is irregularly dilated. There are small pigmented deposits on the anterior capsule of the lens. The lens itself appears clear. Ophthalmoscopic examination; the vitreous seems slightly turbid. The fundus appears quite normal.

The patient became extremely anxious over the conditions of the eyes, came directly to Baltimore, arriving at night and entered Johns Hopkins Hospital, where all examinations were made and treatments carried out. Right, diabetic cataract, subsiding iritis. Left, acute iridocyclitis, probably diabetic.

General examination, Dr. Shands. The patient is an extremely obese woman. Thyroid is markedly enlarged without nodules. The lungs are essentially clear thruout. The heart is enlarged to the left with a faint systolic murmur. Dorsalis pedis artery is palpable on both sides. The abdomen is essentially negative except for obesity. The legs show a generally unhealthy tint in the skin. There are dark brown spots over the feet and legs which represent the results of old sores. Beneath the left toe there is an ulcer, hard, firm edges extending to nearly the bones, discharging a great deal of pus. B. P. 170 systolic, 100 diastolic. Twenty-four hour specimen of urine total output 1,200 cc. specific gravity 1,025. Sugar three plus, albumin trace. Microscopic examination showed many pus cells, no casts. The cytologic examination of the blood is essentially normal. The phthalein test showed an output of 60 per cent over the two hour

period. The blood sugar, .322 per cent. Blood nonprotein reaction was 33.10 mm. for 100 cc. of blood.

The case appears to be quite clearly one of advanced diabetes with diabetic cataract of the right and acute diabetic iritis of the left. It is advised, however, that other foci of infection should be eliminated. Nose and throat consultation was ordered, and was negative. The teeth have all been removed and this source of infection can be eliminated. Pelvic examination showed no evidence of a pelvic source of infection.

Treatment ordered:. The patient was put on practically a carbohydrate free diet, total calories limited to 1,500 cc. Insulin was administered, beginning June 19th, kept up steadily, the patient receiving 20 units per day in two doses at twelve hour intervals.

Under this general treatment the urine became sugar free by June 26th, and by June 30th, the blood sugar had fallen to .155 per cent in the neighborhood of which fraction it remained steadily during the entire course in the hospital. There was no tendency at any time toward acidosis. The diabetes was therefore gotten under perfect control and maintained under control.

When the patient was first seen on June 16th, homatropin 2 per cent solution was ordered to be put in the left eye three times a day. Five per cent dionin solution was ordered to be used at night and dry heat in the form of a Japanese hot box was ordered to be applied every four hours. On June 19th, the right eye was unchanged. In the left eye a pericorneal congestion was still violently present. Ciliary tenderness was slightly less, the pupil was not dilated in spite of the use of homatropin. The vitreous was full of fine opacities and near the central area in retina a small sharply defined exudate was found. Attempt to dilate the eye with homatropin was continued and on June 22nd, a moderate dilation of the pupil was obtained. The eye showed a slight improvement by June 30th at which time the patient complained of a fresh pain in the eye. The general appearance of the eye was unchanged but the tension which had been normal on the daily examination, was distinctly plus with fingers, estimated at plus 1. Tonometer was not used. Homatropin was omitted and July 1st, twenty-four hours later the tension had returned to normal but the pericorneal congestion had greatly increased. The pattern of the iris was blurred and the haze in the vitreous had increased. Homatropin was used again with the result that on July 2nd tension was again definitely elevated, estimated at plus 2. Homatropin was discontinued and on July 3d, tension had again returned to normal. Pupil was rapidly contracting.

It was felt at this time that the condition was critical. The right eye had been practically lost by a diabetic iritis and cataract and appeared at the best an excessively poor operative risk, the vision being limited to light perception and very poor projection. The left has a violent iritis, which in spite of treatment, is raging with undimished intensity. The local treatment of heat, dionin, and a mydriatic had done some good for the first two weeks but it appeared impossible now to use any mydriatic without throwing the patient into a glaucoma. Salicylates might be used but it appears unwise to use them in a diabetic so advanced. It was decided to try nonspecific protein therapy in the hope that something might be accomplished by this measure. On July 3d, the W. B. C. was 6,000, temperature normal. On July 4th, she was given intravenously 25,000,000 killed typhoid bacilli at 12:00 o'clock. One hour later there was a slight chill. Temperature rose to 101° at 4 p. m. Leucocytes increased. On July 5th the leucocytes had fallen again to normal. Temperature had fallen to normal. The pericorneal congestion appeared somewhat less and vision appeared clearer altho no effect was made to estimate the exact amount of vision.

On July 8th, patient was given 50,000,000 killed typhoid bacilli intravenously. She again reacted with a fever of 100.8°, with a leucocytosis which again subsided within twenty-four hours. The eye was enormously im-

proved; it showed only a faint pink congestion. There is only a slight ciliary tenderness. Homatropin was ordered on July 11th, and continued steadily until dilation of the pupil was obtained without any rise in tension. On July 14th, the eye is quite clear of inflammation, the pupil is irregularly dilated, the blurring of the iris pattern had disappeared, the vitreous showed only a few opacities, there were several exudates sharply defined in the perifoveal region, but the fovea itself appeared clear, tension was normal.

On July 18th, the eye appeared quite free of inflammation, normal tension, general condition as on July 14th. Vision greatly improved over admission. The ulcer of the big toe has healed. Insulin had been diminished on the 12th and the patient put on a maintenance diet, which she was taking without the appearance of sugar in the urine. Blood sugar .167 per cent. It was felt that the crisis is safely over, the patient is in as good condition as can be obtained. She was ordered for refraction examination on July 19th, but on the night of July 18th, family complications made it necessary for her to leave Baltimore unexpectedly. Several communications with patient since discharge. She obtained glasses from a local oculist and reports that she has 20/30 vision in this eye. She has kept on her diet and states that her urine has been sugar free on various examinations and that she had no further ocular inflammation.

842 Park Ave.

NOTES, CASES, INSTRUMENTS

MERCUROCHOME IN THE SPUTUM.

CLARENCE LOEB, M. D.

CHICAGO, ILL.

The following case presents an interesting feature which I have never seen referred to in the literature.

Mr. G. J. B. came to me for treatment for a mild case of conjunctivitis. A part of the treatment consisted in the use of 2% mercurochome 220, 1 drop three times a day. A day or so later, he stated that he had been alarmed to find his sputum stained red. He had, at first, thought this was due to the presence of blood, but upon closer observation, he had noticed that the color was more pronounced shortly after the drops had been used, and became less thereafter. Accordingly, he had come to the conclusion that the mercurochome had passed into his nose, altho he did not know of any anatomic connection. He stated on questioning, that his eyes did not tear in cold weather, which would indicate a rather patulous lacrimal passageway.

The above phenomenon occurring in a nervous patient, or one in whom there was a suspicion of tuberculosis, might cause grave consequences. It must be very rare, as I have never heard of it before, altho I have used mercurochome in many cases. However, since it might occur in any case, it would be well for those who use this remedy to warn the patients of the possibility of a reddened sputum, and to assure them of its innocuousness.

DEEP RING ABSCESS OF THE CORNEA.

CLARENCE KING.

CINCINNATI, OHIO.

The patient, Mrs. H. B., age 87, was first seen July 14th, 1924, in consultation with Dr. Donald J. Lyle. About a week previously, the right eye became inflamed and painful. This eye had been operated upon successfully for cataract by Dr. Robert Sattler in 1921. The patient was admitted to the Jewish Hospital the morning of the day of the examination.

On examination of the right eye, the eye lids were found to be swollen and edematous. There was no tenderness at the orbital margin or in the region of the tear sac. A mucopurulent discharge was present in the palpebral fis-

sure. On separating the lids, the papebral conjunctiva was reddened and covered by mucopurulent exudation. The bulbar conjunctiva was intensely injected and was chemotic. Some exophthalmus was present, and the movements of the eyeball were limited in all directions. The cornea was steamy. Its center portion was hazy and grayish in color. In the periphery of the cornea, about 2 mm. from the limbus was an infiltrate, yellowish white in color, and in outline concentric with the corneal margin. The diameter of this opacity was almost two millimeters. On the outer side it seemed rather sharply delimited from the peripheric corneal stroma. On the inner side the line of demarcation was not so obvious. The cornea could not be stained with fluorescein. At the periphery of the cornea above, was apparent in the limbus, the scar of a previous cataract incision. This scar was not ectatic or fistulous, and showed no evidence of abnormal healing. The anterior chamber was shallow. The aqueous was turbid. There was an operative coloboma of the iris upward. An iridocyclitis was present. The pupillary area was occupied by a purulent exudate. The tension of the eye was much increased to palpation. There was no light perception present. Patient complained of pain radiating over the right temple. Smear and a culture of the secretion showed pneumococci. Slight fever present.

A diagnosis of deep ring abscess of the cornea and panophthalmitis was made and evisceration was advised. The next day the inflammation had increased in severity. The chemotic conjunctiva protruded between the lids and the exophthalmus and limitation of movement were more marked. The eye was eviscerated on July 16th, (Dr. D. Lyle). The abscissed cornea was fixed and prepared for sectioning. The patient made an uneventful recovery. The specimen was sent to Professor F. H. Verhoeff of Boston for pathologic examination. He confirmed the diagnosis of deep ring abscess of the cornea. A microphotograph made from one of the sections is submitted.

Report of Dr. Verhoeff is as follows: "The specimen consists of the entire cornea which has been excised from the eye. Macroscopically the cornea shows a ring of infiltration situated about 1½ to 2 mm. from the limbus all around and 1 to 1¼ mm. in width. On microscopic examination, the cornea shows a dense purulent infiltrate on each side corresponding to the ring infiltration. This purulent infiltrate involves the posterior 7/8 of the cornea on one side. On the other side the infiltrate is less dense and involves about 1/3 the corneal thickness, leaving the anterior portion of the cornea very slightly infiltrated and the posterior part of the cornea still less infiltrated. The corneal endothelium has everywhere been completely destroyed. The epithelium has been destroyed over the central portion of the cornea. The central portion of the cornea is considerably infiltrated with pus cells in its anterior and middle layers. The posterior third of the cornea is here necrotic and relatively free from pus cells. Adherent to one edge of the specimen is a small amount of pus evidently from the interior of the eye. The Gram stain shows this pus to contain pneumococci in great abundance. No bacteria are present within the cornea itself.

Comment: This is a typical case of ring abscess of the cornea. The infiltration of the cornea is evidently not due to infection of the cornea but to toxin which has diffused thru the central portion of the cornea and caused necrosis there. The accumulation of leucocytes in ring form is due to the chemotactic action of the toxin. The toxin has attracted the leucocytes up to a certain point beyond which few of them have been able to extend owing to the destructive action of the toxin."

A ROTARY BIFOCAL.

G. W. VANDEGRIFT, M. D.

NEW YORK.

Eye specialists are well aware of the inconveniences and possible dangers attendant upon the usage of bifocal

lenses, i. e., lenses that are arranged so that a lower portion is ground for near or reading purposes and the balance of the lens arranged for distance.

Of course bifocal lenses offer great advantages over the use of two pairs of glasses, one for reading and one for distance. They prevent frequent changing of the glasses, but as the lower part is gound for a fourteen inch or a reading focus it stands to reason that when one stands erect his eyes are about five feet from the ground, and the vision at this distance can only present a blurred effect. It is impossible to clearly see one's own feet or the ground or the steps of a staircase. Not only is this annoying and inconvenient but many accidents have occurred from this obscuration of vision.

A remedy for this defect has been evolved by the simple means of placing the lens in a rider or carrier, capable of traveling one hundred and eighty degrees and fitted at both ends with a locking device to prevent shifting of the lens. The lens and rider are inserted in an ordinary frame fitted with a narrow groove. Exact traveling of one hundred and eighty degrees is necessary in case cylinder correction is worn that the axis may not be shifted.

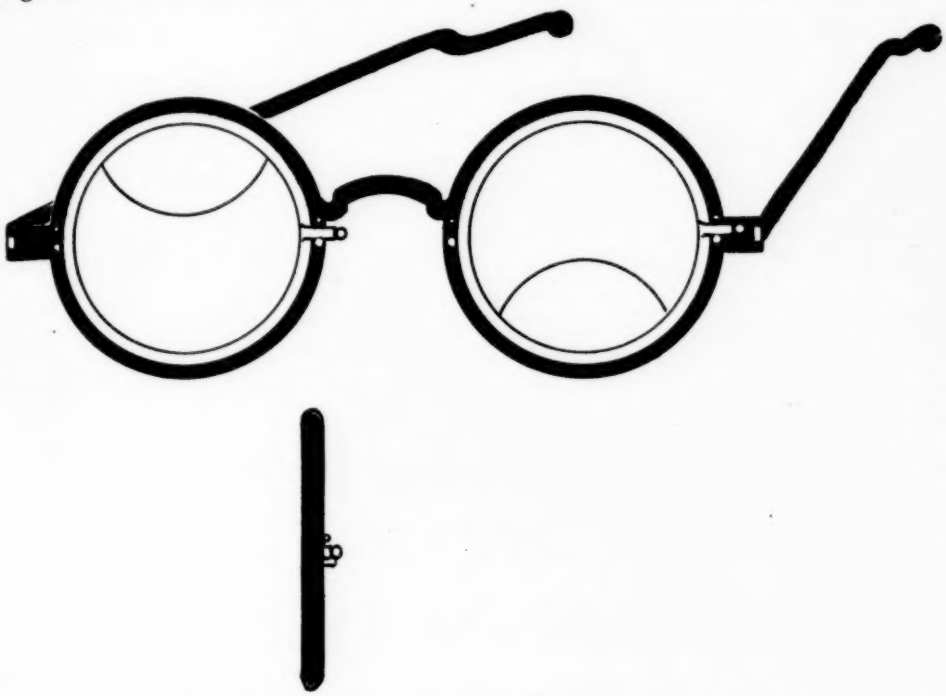

Fig. 1. Rotary bifocal. Right glass turned with film up, left with film down.

The field of usefulness of such a bifocal is large, apart from the freedom of annoyance and accidents. Cloth examiners, librarians and others who may need near correction above will find them an added convenience.

60 W. 88th St.

SOCIETY PROCEEDINGS

THE PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

FEBRUARY 23, 1925.

DR. E. B. HECKEL, Presiding.

Ectasia of Sclera, Megalocornea, Glaucoma.

DR. EDWARD STIEREN reported the case of a steelworker, 28 years of age, who was led in by a fellow workman, stating that he had suddenly become blind the day before, following a painful accident to his right knee.

The right eye diverged, the cornea being uniformly cloudy. The left pupil was widely dilated. Both corneas measured 16 mm. in diameter and were decidedly convex, the anterior chambers for this reason being inordinately deep. The eyeballs were enlarged proportionately.

No view of the right fundus could be obtained on account of the cloudy cornea. The media of the left eye were clear, the disc atrophic, oval horizontally and was deeply excavated. The tension of each eye was 60 mm. McLean. Vision in each eye reduced to light perception. With the retinoscope there was approximately seven diopters myopia in the left eye.

Under the use of eserin the tension of each eye promptly dropped to 25 and vision in the left eye was recorded as 1/30 with —7. D. S. The haze of the right cornea diminished.

The case was undoubtedly one of hydrophthalmos or buphthalmos, the interesting features being the sudden loss of vision following a distant injury, the shock reacting on the eye thru the sympathetic nervous system, and the prompt recovery of normal tension with partial recovery of vision from the exhibition of eserin. It is also unusual to find this condition bilateral.

Discussion. DOCTORS KREBS, SMITH and HECKEL remarked the great rarity of bilateral buphthalmos. Dr. Turner and Dr. Markel had each seen one case in his practice, Dr. Turner's case having been an elderly Swedish woman. Dr. Heckel saw two cases which went to enucleation; in the one there was an excavation of the disc of 3 mm.; the other showed no excavation. In answer to question, Dr. Heckel stated that he does not operate these cases. An iridectomy does not achieve anything. He uses miotics under close observation. Dr. Stieren agreed with this procedure. He trephined one case. There was no improvement in vision, but the tension remained low.

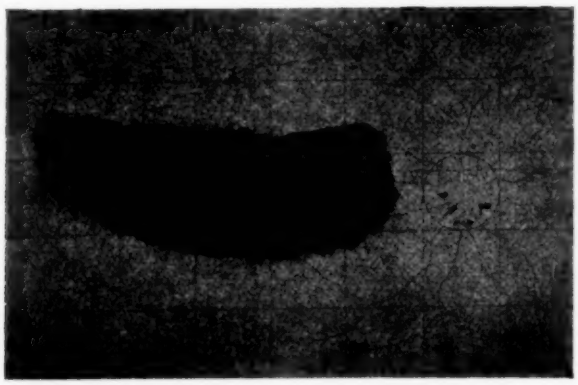

Fig. 1. Preretinal hemorrhage. Case of Miss F. Y.

Preretinal Hemorrhage.

DR. SCOTT L. KOCH reported the following three cases:

Miss F. Y., nurse, age 24 years, Februray 12, 1923, complained of loss of vision in right eye and sensation of seeing red. The condition appeared suddenly three days previously. There was no history of injury. R. vision, count fingers at six inches, apparently

indirect. L. vision, 6/6. External examination entirely negative.

Ophthalmoscopic examination showed right eye, large, massive hemorrhage lying between retina and vitreous; hemorrhage extends from the margin of the disc to a point well over in the temporal field, about three disc widths beyond the macula. The hemorrhage is slightly elliptical in shape, the largest vertical diameter being in the region of the macula. The upper border of the hemorrhage is of a light shade and fades off into the color of the normal retina. From above downward the color becomes gradually denser; the lower border is a very dark red (Fig. 1). There are several fine petechial hemorrhages on the disc. The remainder of the fundus was entirely negative.

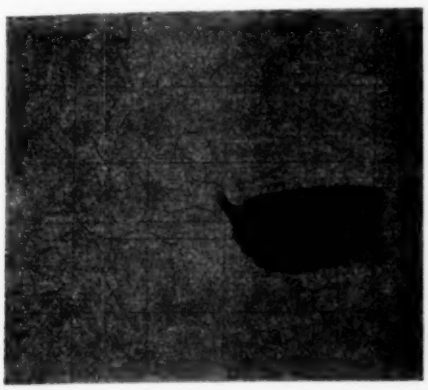

Fig. 2. Preretinal hemorrhage in eye of Mrs. S. R.

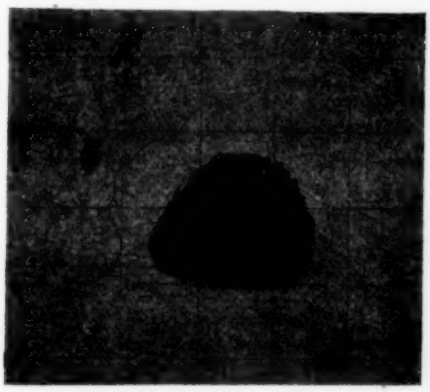

Fig. 3. Preretinal hemorrhage at macula and above disc in eye of Mrs. T. T.

The patient was sent to the hospital and ordered to bed for absolute rest. All examinations, including Wassermann, X-ray of teeth, examination of sinuses, urinalysis and general physical examination proved negative.

Treatment. One per cent atropin t. i. d., dionin 5 per cent once daily. Cabinet sweats and sufficient catharsis to keep the intestinal tract well cleansed. The patient was discharged from hospital on February 26, vision 6/10, all hemorrhage had absorbed and there was some dust like pigmentation in the macular region.

Patient returned to the office March 3, stating that the eye, since the previous day, was much worse. The fundus examination showed fresh hemorrhage, as large as the original one. The circumstances did not permit the patient to return to the hospital, so she was treated as an ambulatory patient. One per cent atropin was used t. i. d. and five per cent dionin before retiring. Subconjunctival injections of normal salt solution were resumed at intervals of two to four days, depending on the amount of reaction. Internally, patient used mercury three times daily. At the end of three weeks, the hemorrhage had disappeared entirely and patient was able to read 6/7.5+++.

Mrs. S. R., aged 22 years, housewife, August 18, 1923. She gave a history of waking up one morning and finding the vision in the left eye very much reduced. The vision in the right eye was 6/5; in the left eye 3/60, apparently indirect. External examination of both eyes negative. O. S. showed a semielliptical area of hemorrhage completely covering the macular region, and had all the characteristic appearances of preretinal hemorrhage (Fig. 2). This patient was seen in consultation and the ultimate outcome is not known.

Mrs. T. T., age 20, colored, housewife, September 29, 1923, stated that she had experienced some loss of vision in the left eye three days previously. There were no other subjective symptoms. Patient was eight months pregnant and this was her first pregnancy. Pa-

tient was under constant treatment thruout pregnancy for a failing compensation of the heart. Vision in the right eye was 6/12, which was improved to 6/6 with —1.00 sphere combined with —1.25 cylinder at axis 180°. Vision in the left eye was 1/60. Patient said that at times she had a sensation of seeing red. Externally, the eyes were entirely negative.

Ophthalmoscopic examination of the right eye revealed no pathology. In the left eye there was a large preretinal hemorrhage beginning at the temporal margin of the disc and extending beyond the macula (Fig. 3). The lower border of the hemorrhagic area was much darker than the upper border. There were also several striate areas of hemorrhages above and to the nasal side of the disc. Intensive treatment over an extended period of time did not influence the absorption of the hemorrhage so that treatment was discontinued until after the birth of the child. The same treatment was again instituted and the hemorrhage cleared up very promptly in about three weeks. At the last consultation, vision in this eye was 6/20 and was improved to 6/6 by a —0.75 sphere combined with —0.25 cylinder at axis 180.

Discussion. Dr. Krebs stated that he uses subconjunctival injections of salt solution, but has seen no reaction from it. He uses rest, atropin and dionin in addition.

Dr. Stieren and Dr. Heckel doubted if treatment does any good in these cases. The latter used atropin locally and potassium iodid internally.

G. H. Shuman, M. D.
Secretary.

MINNESOTA ACADEMY OF OPHTHALMOLOGY.

Meeting of March 13, 1925.

Dr. J. S. Macnie, President.

Myasthenia Gravis.

Dr. John C. Brown (St. Paul) presented the case of Mr. J. R. D., 42 years, locomotive engineer, first seen on October 4, 1916. At this time he gave a history of a chronic conjunctivitis, and a bilateral ptosis of the upper lids; with inability to raise the eyes above the horizontal plane. He was fitted with glasses, which then gave a vision of 20/15 in each eye. (R., —2.00 cyl. ax. 115°; L., —1.87 cyl. ax. 70°).

In March, 1918, he returned, complaining of his eyes. Ptosis was the same in each eye and there was a limitation of movement of the eyeball, worse in the left eye. This was noted when he was reading, and in trying to move his eyes quickly in a lateral direction, one seemed to lag behind the other. The eyegrounds showed no abnormality and the vision was 20/15 in each eye. There was a decided wrinkled appearance of the forehead, from the action of the musculus frontalis in an effort to raise the lids.

On April, 1920, he complained of not being able to read at night; in fact, he was unable to raise his lids toward the end of the day. The left eye does not follow the same line as the right. The muscles showed 2½° esophoria and with glass 3½° esophoria. There was ½° hyperphoria. For near 14° exophoria and with glass, 13° exophoria. At this time he was wearing R., +0.50 s.⊖+2.25 ax. 125°. L., +50 s.⊖+2.25 ax. 55°, and +1.75 sph. added for near. The Wassermann reaction was negative. There was a characteristic facial expression developing, besides the ptosis, and speech became more of an effort and swallowing was slow and labored. There have been no signs of nystagmus in this patient. There has remained the same ratio between esophoria for distance and exophoria for near. At present he is wearing a glass in the right eye of +1.25 sph. ⊖+ 125 cy., ax. 150°. L., +1.25 sph. ⊖+.75 cy., ax. 180° and +2.25 sph. added.

Penetrating Injury.

Dr. John C. Brown (St. Paul) presented the case of Mr. W. J. C., aged 39, who, while chopping kindling, was struck in the right eye with a splinter of wood, which entered the cornea near the limbus on the nasal side, penetrated the iris near its root and extended into the vitreous. He saw him about half an

hour later when the sliver was removed. There was a collapse of the aqueous chamber, the cornea resting on the lens surface. There was a slight blood stain along the lower margin of the limbus, and a reddened area about 5 mm. along the limbus margin adjacent to the puncture and within the conjunctival tissue. There was no free blood which could be seen within the vitreous or in the anterior chamber. The splinter, which was quite sharp like the small end of a toothpick, was 5 mm. long and broken off flush with the collapsed cornea. This was removed without a great deal of trouble after cocainization. Atropin was instilled and the eye bandaged. He was started on 180 grains of sodium salicylate in the 24 hours and sent home.

The following day the aqueous chamber had refilled. There was dilatation from the atropin and circumcorneal injection, and the aqueous chamber was filled with inflammatory exudate and flocculent precipitates. The vitreous was so clouded that no red reflex could be had with the ophthalmoscope. He had only light perception and nothing could be seen within the fundus. At this time I asked Dr. Fulton and Dr. Brooks to look at him. This case looked to Dr. Fulton and myself as a very severe test for the boiled milk injections, and I gave the patient in the right thigh 8 c.c. milk, boiled for 5 minutes. This gave a very marked reaction and rise of temperature to 101 degrees. The next day he was seen at his home, and much to my surprise, 48 hours after the injury and 20 hours after the milk injection, he could count fingers at 5 feet. The 3rd day after the injury he was able to get out again, and was given another 8 c.c. of boiled milk. The iris, aqueous, lens, and vitreous were entirely clear and the details of the smaller retinal vessels were easily made out.

Vision in right eye, 20/50; with + 1.50 S. = 20/30.

The eye from now on remained quiet. He was given a pair of glasses, R. and L. +1.00 sph., with which he read 20/15 with each eye March 9. This cycle was completed in 8 days following the injury and its complications. Whether results of this spectacular case were due to fortuitous circumstances, it would seem that the happy ending must be attributed to early treatment, the massive doses of sodium salicylate and, by no means least important, the injections of boiled milk and its prompt reaction.

Discussion. Dr. F. E. Burch said that in his experience milk injections have been exceedingly painful. If the milk is boiled too long—over 4 to 5 minutes—it produces much less effect and he had seen very painful swelling a number of times. For the last 2 years, for foreign protein therapy, he has been using the triple typhoid vaccines. With these the results are sometimes almost miraculous in cases of iritis, uveitis, either acute or chronic inflammations. The reason for preference for triple typhoid vaccine is that the dose can be regulated. One can feel more certain of the dosage and there are no painful local after effects. The effect is more immediate. In giving the triple typhoid vaccines it has been his practice to take the leucocyte count before and then 8 hours afterwards, and never repeat the injection until the leucocyte count has returned to normal. He usually begins with 1/5 mm. of standardized triple typhoid vaccin, and if leucocytosis produced is satisfactory (16,000-18,000) does not increase the quantity injected until he finds a larger dose is needed to produce a greater effect. He believes the leucocyte count an effective method of checking the action of the foreign protein.

Dr. Fulton said that he was sorry that Dr. Brown had weakened the wonderful result obtained by the milk injections in his case of trauma of the eye, by relating the massive dosage of salicylate administered. No improvement whatever took place until the foreign protein was administered. Dr. Fulton felt that the result in this particular case is the most remarkable that he had had the opportunity to witness.

Foreign Body in the Eye.

Dr. K. C. Wold (St. Paul) presented the case of R. E. H., male, aged

18. When first seen on January 30, 1925, complained of blurred vision in the left eye. Patient stated that a foreign body had been removed from the cornea about three weeks previous to this examination, following an injury to the eye while sharpening a tool on an emery wheel. The vision was not impaired until the day after injury, but since then the vision has greatly become worse. There is no pain or redness.

Examination: O. D., normal; O. S., linear corneal scar over pupillary margin, about 3-4 mm. in length. On the anterior capsule immediately beneath corneal scar there is a small dark deposit. On a line with these opacities and situated near the posterior capsule is a small foreign body with a definitely metallic luster. Eyeball shows no evidence of inflammation. V., = O. D., 6/6; O. S., 6/10.

A giant magnet was used in an attempt to remove or dislodge the foreign body, with no success. This procedure was repeated one week later, with the same result. This eye has been examined every week since and at no time has there been any inflammation or increased tension. The lens, however, has become more opaque at each examination and at present he can count fingers at 6 feet. It has been deemed inadvisable to disturb this eye in any way, following failure to remove the foreign body with a magnet. When the lens is completely opaque and the occasion arises, lens and foreign body will be removed by intracapsular extraction.

Discussion. Dr. Burch said that in this case, with the slit lamp he was able to determine the depth of the tiny particle of steel in the lens. It was one of the few cases where the use of the slit lamp had been especially valuable in foreign body localization.

A Discussion of Radium Therapy.

Dr. A. S. Fleming (by invitation) read this paper.

Discussion. Dr. Burch said he was sorry Dr. Fleming had not discussed the radium treatment of inoperable tonsils, e. g., in cases of tuberculosis, or in very debilitated senile patients. He thought the members were interested in knowing whether that type of patient can obtain any results from radium.

Dr. Burch asked as to the technical use of radium in glioma; whether the essayist would think that in ocular glioma, which now presents such a terrible mortality, any better hope can be held out for these patients by preliminary use of radium, before the eye is enucleated. He had recently sent home two patients with glioma, refusing to operate. In one case it was binocular, and in the other he had told the parents that the prognosis was so bad that they did not desire the child operated.

In cases of sarcoma of the choroid, Dr. Burch thought there is a very great field for the implantation of radium, especially in cases where the tumor is apparently intraocular and has not reached the stage of tension and glaucoma. Dr. Burch said he had seen 7 cases of sarcoma, 5 of which had been reported to this Academy, in all of which radium had been used after enucleation; in two, before. Of these reported to the Academy, one had died from recurrences in the liver, one returned with recurrences in the thyroid, and 3 with no recurrences in 3 years. The two recurrent cases were glaucomatous when operated. He wanted to ask Dr. Fleming what his experience had been in sarcoma of the choroid.

Dr. A. E. Smith said he thought Dr. Fleming was a little too modest about the case of sarcoma of the antrum, which Dr. Smith considered a very fine result. Dr. Smith said, that at the first operation there was not a complete removal of the tissues on account of extreme vascularity, and the patient had no relief from the extreme pain. After the 2nd operation the relief from pain after the application of radium was very remarkable; and this old man after living in extreme pain, wandering in his mind, and having almost epileptic attacks, has had a period of months and years of very happy useful life. Dr. Smith thought it was a very pretty result, from the standpoint of radium application and the apparent freedom from pain over such a long period.

Dr. Fleming, in reference to the radiation of infected tonsils, felt that a clean and complete enucleation is the first method of choice, as he was not convinced that the fibrosis and shrinkage following radiation will completely eliminate the infected follicles. Moreover there is a possibility of reserved lymphatic hyperplasia in lymph follicles not entirely destroyed. In the inoperable cases mentioned by Dr. Burch, radiation by radium is to be preferred to X-ray on account of the facility and accuracy of its application. Diffuse radiation of the lymphatic tissue in the nasopharynx may be too much of a good thing, and a dry and almost painful rigidity of the pharynx may result.

Dr. Fleming stated that the use of radium in the treatment of glioma holds out the hope that, in early cases where the growth is limited to the interior of the eye, enucleation and immediate radiation of the orbit by implanting radium in the orbit before the dressing is applied, may prevent recurrence or extension. They had one case living for 4 years, operated when 18 months old, with no involvment of the other eye and no intracranial extension.

As to preoperative radiation, Dr. Fleming said he did not feel that one is working to the best advantage of the patient in an urgent malignant case, and moreover it might predispose to postoperative infection. The immediate implantation of radium in an operative field has not interfered seriously with the healing, and places radium in an advantage in reaching the outlying line of advance if this is at all possible.

Dr. Fleming said his experience in sarcoma of the choroid was limited to recurrent cases and that nothing more than palliation and delay had been secured. Pigment bearing cells are highly resistant to radium, and he thought that pigment formation is a natural response in specialized cells to radiant energy. He said that it is known from experience that the mature eye is highly resistant to radium.

Dr. Fleming said he had hoped that some one would discuss the application of radium in cases of incipient cataracts. He had not used radium in any cases of cataracts, as it was difficult for him—from what little he knew of its pathology—to understand the rationale of radium application in these cases.

Dr. Watson said that the original articles on radium treatment of cataract, referred to by Dr. Fleming, could hardly have inspired any one who had read them carefully with confidence in that form of treatment. Dr. Watson believed that about 83% of the cases treated were reported as improved, but when one studied the details of each case it becomes very evident that in by far the greater number the improvement was so very slight as to leave considerable doubt in one's mind as to whether it was real or imaginary. Indeed, nearly all of the illustrations of the lens before and after treatment, shown in one of the articles, tended to impress on one the utter futility of the treatment, as it was nearly always only by the utmost stretch of the imagination that any objective change could be seen at all, even in the cases reported as improved.

W. E. Camp, Recorder.

COLORADO OPHTHALMOLOGICAL SOCIETY.

March 21, 1925.

Dr. W. F. Matson, presiding.

Familial Defects of Lens and Iris.

F. R. Spencer and C. L. La Rue, Boulder, presented a remarkable family group of cases of congenital defects involving the crystalline lens and the uveal tract. The mother, aged 35 years, had come complaining that her right eye had turned in since birth and that the vision of this eye had always been very poor. On March 20, 1925, her vision was R., 2/60; L., 2/10, improved by correction to R., 6/12; L., 6/7.5. The iris was very light gray in color. In the right eye there was a coloboma of the iris at three o'clock, and the reactions of the pupils were very slight. The pupil of the left eye was slightly oval, being elongated toward nine o'clock. Its reaction was less active

than normal. There was a coloboma of the lens corresponding to that of the iris, but the fundus seemed to be negative. There was an opacity in the right lens corresponding to the coloboma. There was also a very delicate central opacity of the left lens.

A son, aged nine years, had vision: R., 4/60; L., 6/60. There was pronounced nystagmus. The extent of the iris was an irregular rim at the ciliary border. The pupil measured 6.5 by 7 mm. and was irregularly oval. There were no reactions. There was a rather dense opacity in the center of the right lens and a fainter one in the center of the left lens, extending down to the lower edge. There was a coloboma of the ciliary body, of the choroid and of the optic nerve in each eye.

Another son, aged two years, had opacities of both lenses, sufficiently extensive to prevent a satisfactory view of the fundi, but there was strong suspicion of the presence in each eye of a coloboma involving all the uveal structures. There was a narrow margin of light gray iris at the ciliary border, and the irregularly oval pupils were about 6 mm. in diameter, and without reaction.

The mother was one of twelve children, and felt sure that all the other children and various relatives had been without ocular defects. The father's eyes were without defects, as were those of one other child, a boy of thirteen years.

Discussion. EDWARD JACKSON, Denver. These defects are probably due to disturbance at a late stage of fetal life.

W. H. CRISP, Denver, thought that in one or more of the cases there had probably been prolonged contact of the lens with the cornea, in analogy with the cases in which a more regular opacity at the anterior pole of the lens is connected by a fine strand with the back of the cornea.

Retinitis.

D. A. STRICKLER, Denver, showed a man, aged 47 years, whose right eye had a central retinitis, with numerous small hemorrhages in the macular region. Blurred vision in this eye had been noticed for about ten days, more especially in the upper field. The blood pressure and urine were normal.

Discussion. W. C. BANE, Denver. Some of the hemorrhages appear as round dots, some are flame shaped, and there are none around the disc. But altho the appearance is not typical of albuminuric retinitis, involvement of the kidney may show up later.

E. R. NEEPER, Colorado Springs, referred to a similar case seen recently with obscure history, and without evident causal factor.

EDWARD JACKSON, Denver. The case seems to me to be one of thrombosis of a small branch, or branches of the retinal vein. In such cases, according to Moore, hemorrhages are likely to recur over long periods and to be very slow in clearing up. Nearly ten years ago I saw such a condition in a patient who, within the past two or three years, had another group of hemorrhages lasting for several months, between the optic disc and the macula. The vision has returned to normal.

W. A. SEDWICK, Denver. The patient has very suspicious looking teeth, capped, and he thinks devitalized.

Vertical Diplopia After Contusion.

W. M. BANE, Denver, showed a man, aged 31 years, whose left eye had received a severe blow from the handle of a heavy wrench. After the very extensive orbital and subconjunctival hemorrhage had cleared up sufficiently for the eye to be used, the vision was found to be 5/7.5, and there was vertical diplopia which was corrected by a five degree prism, base down before the left eye. The deviation had rapidly diminished to 1.5 degrees. There was no apparent disturbance of the important structures of the eyeball.

Vitreous Exudate After Steel Injury.

W. M. BANE, Denver, showed for further observation the patient who had been presented in February, 1924, on account of a glancing injury to the right eye by a piece of steel which passed thru the upper lid, cut the coats of the eyeball above, and lodged in the orbital tissue. The vitreous had now

cleared sufficiently to show a large mass of contracted exudate. Vision was limited to large objects in the inferior nasal field. There were several bloodvessels on the face of the mass of exudate.

EDWARD JACKSON, Denver. There is still blood clot and membranous remains on either side of the glistening mass of exudate, but the general clearing up is still going on.

Injury or Interstitial Karatitis?

W. C. Bennett, Denver, presented an ex-soldier who was under the care of the United States Veterans' Bureau, on account of a disturbance of the right eye. There was a mottled infiltration of the right cornea. The attack was said to have begun in October last, and was attributed to some green salt having got in the eye from a battery. Early in March the vision had dropped to 20/65. Several years before the vision of the left eye had been badly affected for a year and a half, altho the vision of this eye was now normal. The patient stated that he had a negative spinal Wassermann about two years earlier, and a blood Wassermann made at the Denver station of the Bureau was negative. X-ray of the sinuses was negative. The records showed that a diagnosis of papilledema in each eye had been made in October, 1922, but the corrected vision of the right eye had been shown as 20/13 in April, 1924.

Discussion. W. A. SEDWICK, Denver. I saw the case a week ago, when vision of the affected eye was 20/200. I regarded the case as one of superficial punctate keratitis.

G. F. Libby, Denver. This patient came in last autumn for an opinion, and the picture seemed to me then to be one of interstitial keratitis, probably due to syphilis. If there is no syphilis behind this condition there is certainly a profound disturbance of local nutrition.

W. H. CRISP, Denver. The opacity is not discrete or superficial enough to represent a superficial punctate keratitis; and it seems likely to be a luetic keratitis.

WM. H. CRISP,
Secretary.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

MARCH 13TH, 1925.

PRESIDENT, SIR ARNOLD LAWSON.

Facial Paralysis with Nuclear Atrophy.

DR. H. C. CAMERON showed a case of bilateral facial paralysis with nuclear atrophy. He had been taken to an eye hospital because of epiphora. The trouble extended upwards and involved the oculomotor nucleus, the movements of the eyeball being very limited. The boy spoke well, except that he substituted t and d for p and b. The state had remained unchanged since the second year of life.

Vomiting with Ptosis.

He also showed a case of cyclic vomiting, with ptosis. Without any obvious exciting cause, he had attacks of prostration, pyrexia and vomiting, and he also had acetonemia. The attacks were heralded by ptosis, by which his mother was warned of an impending attack hours before it occurred.

Discussion. MR. WHITEHEAD asked whether there was complete recovery between attacks. He called these fugitive spasms. He considered that true migrainous attacks were completely recovered from in the intervals.

THE PRESIDENT pointed out that in the first case there was complete conjugate paralysis of the lateral movements of the eye, but the patient could look up and down. Apparently there had never been any power of movement laterally.

Retinal Glioma.

MR. A. W. ORMOND showed a case of glioma of the retina which had been treated by deep X-ray therapy. He saw the patient first when he was 7 weeks old; the glioma was so obvious that the eye was removed, and sections cut, and the diagnosis confirmed. At that date the other eye seemed to be quite good, but in a few months it became evident that a change was taking place in it, probably also gliomatous. The question then arose whether it also ought to be removed, or whether there were any other measures which could

be tried. The parents refused to have it removed. Dr. Watt thereupon commenced to treat it with deep X-ray therapy. Since that had been done there appeared to have been no advance in the disease.

Discussion. DR. WATT said deep therapy meant that at least 220,000 volt strength was being used, and this was driven thru a special tube, with a complete vacuum, at 60,000 miles per second, and this, when it struck the target, generated very short wave rays, i. e. about a billionth of a centimeter in length. 15 to 20 mm. of aluminum was used, which allowed the very short rays to play on the skin or part to be treated. He described the method of measuring the dose used. The dose for glioma was 80 per cent of the skin dose. The conjunctiva would not stand as much as the skin. This patient had had four series of irradiations, and the result was encouraging enough for it to be used on other similar cases.

Retinal Detachment.

MR. ORMOND showed a case of detachment of retina with a hole in the retina. He said the patient was a lady aged 50, who came with the history that she had had some slight premonitory symptoms, that the condition of her left eye was not very satisfactory. Within a week she was suddenly aware of the fact that the sight of her left eye had become very bad. He found that there was a large detachment of the retina, occupying a great deal of the upper part, and there was a large rent in the retina. He advised that she should go home and rest flat on her back for three or four days. He put atropin in, and tied the eye up. He did not think it had made any difference in her condition, except that the position of the detachment had altered. She did not get quite 6/60 vision, and the question was whether it was worth while to subject the patient to further treatment, such as puncture and keeping her flat on her back for several weeks.

Discussion. MR. J. H. FISHER advised the puncture of this eye. He had himself had two cases of recovery from detached retina in the last two years, subsequent to galvanopuncture, and it was right to give a patient this chance.

MR. GRAY CLEGG said his experience in this class of case was not very encouraging, because of hemorrhage; tho now and again he got a good result. He agreed with Mr. Fisher that puncture should be done in this case. Much depended on whether the retina was mobile.

MR. A. L. WHITEHEAD did not think the mobility of the retina had anything to do with the decision in regard to treatment. He believed that when there was a tear in the retina there was unlikely to be a new growth present, but in a person of 50 years of age without any obvious cause of detachment, his experience was that in the majority of instances it was a case of sarcoma.

THE PRESIDENT also advised puncture in this case.

Ocular Anomalies.

MR. ORMOND next showed a case of arachnodactyly. He said that about half the 16 cases of web fingers recorded had eye symptoms; i. e., tremulous iris, congenital dislocation of the lens, and in some cases atrophy of the muscles of the iris.

Hole in Macula.

MR. ORMOND also showed a case of hole in the macula. The youth, aged 21, was struck in the eye by a racquet and there resulted a rupture of the choroid and a hole in the macula. The eye was sound before the accident. Vision was reduced by the accident to 6/36, and it had slightly improved since he was seen last November.

Several other cases were shown, chiefly of a neurologic interest.

H. DICKINSON, Reporter.

SIXTY-THIRD MEETING OF THE NETHERLANDS OPHTHALMOLOGICAL SOCIETY.

PROFESSOR J. VAN DER HOEVE, Presiding.

Translated by DR. E. E. BLAAUW.

Tumor of the Iris.

G. TEN DOESSCHATE reported a case.

Discussion. ZEEMAN asked if the anatomic investigation had explained

the clinical course, which had been marked with recurring vitreous hemorrhages and small knobs in the iris. The broad adhesion of the iris and lens capsule made him ask if inflammatory symptoms of necrosis had been seen.

TEN DOESSCHATE stated that recurrent vitreous hemorrhages had appeared in the other eye, which had been considered due to vascular disease, without connection with the iris anomaly. The retina was atrophic and had occluded vessels. In the iris tumor no necrosis and no infiltration had been seen.

VAN DER HOEVE wished ten Doesschate had discussed the clinical side of the question of iris sarcoma, which is of such great importance. Nearly all iris sarcomata grow slowly and rarely produce metastases. What must be done after the diagnosis is made? Extirpation of the tumor with healthy surrounding tissue, enucleation or radiation? Van der Hoeve showed pictures of different iris sarcomata, one of which was removed with iridectomy and one with enucleation. He considered the clinical diagnosis often quite difficult and even impossible. He therefore advises, so long as the vision was still good, to try to remove the tumor with iridectomy followed by successive irradiation. Enucleation is preferable for very large or quick growing tumors, and for blind eyes.

TEN DOESSCHATE considered iridectomy for these tumors very dangerous; as in one of his cases histologically the entire iris surface appeared filled with tumor, altho it had not been recognized on clinical inspection.

Microphthalmos with Orbital Cyst.

K. T. A. HALBERTSMA showed the sagittal section of a one sided microphthalmos with an orbital cyst with which it was connected, taken from a 19 year old man. The communication between the cyst and the rudimentary eyeball was large, and situated directly below the entrance of the optic nerve. The bulbar wall and its internal lining, which was probably retina, continued directly in the cyst wall. The optic nerve was pressed upward thru the cyst, the sheaths continuing directly into the wall of the globe and cyst. The dimensions of the bulb were 10x12x12 mm. of the cyst 20x25 mm.

The second specimen came from a nine weeks old child. Right sided microphthalmos, with orbital cyst below, was found and extirpation advised. The cyst could not be removed entirely. The specimen showed nothing of a cyst; but at the lower side especially over the nasal half was a solid tumor mass, connected firmly with the layer below and which measured about 5 mm. at its broadest place. The eyeball measured 8x10 mm. Microscopically the nasal half of the cornea was covered with the mass and the stroma was vascularized, the corneal epithelium continuing uninterruptedly over it. The very small anterior chamber lay in the temporal half, filled with fine granules in which were some few small cells. The chamber angle was free above and below. Below, the pectinate ligament was less developed and Schlemm's canal was absent. The small pupil lay down and temporally, the iris bends backward at the lower side of the pupil (entropion). The iris stroma was normal. The dilator contained much pigment in the upper part, but was barely indicated at the opposite side. The iris had a coloboma downward and remains of a pupillary membrane were present. The ciliary body was narrower below and meridional fibers predominated. The choroid was generally well developed; but had a coloboma at the lower side of the optic nerve entrance, and bent along the walls of a scleral coloboma outward. On both sides of the coloboma the choroid was atrophic. The lens lay in the posterior part of the globe, cataractous in its posterior cortical layers. The capsule was folded and thickened in many places, the largest diameter was about one-third of the bulbar circumference. The vitreous was represented by a homogeneous fine thready mass, which filled the globe. In it numerous erythrocytes, some leucocytes, myeloblasts and large round cells lay at the upper side upon the retina. The pigment epithelium at the lower side was broader than upward; it penetrated the

iris root in numerous folds. The ciliary processes were only indicated at the under side by a few folds, but were strongly developed above. The retina was very rudimentary below, anteriorly. But above it was well developed and thickened with "rosettes" of young retinal cells. In the nasal part of the epibulbar mass, in the surrounding mesodermal fat, were found an acinous gland, some pieces of cartilage and striated muscles. These nowhere were in contact with the globe.

Discussion. VAN DER HOEVE showed a suckling, with very large orbits. The wall between was absent. No eyeballs could be detected.

Diagnosis of Miliary Tuberculosis.

GO ING HOEN (Leiden) mentioned, that in many cases the tubercles appear shortly before death. Three case histories follow which demonstrate their importance.

Case 1. An 8 months old child was sent to the children's clinic for regulating the diet. The diagnosis was made by the pediatrist of miliary tuberculosis, on account of fever, typical cough and slightly cyanotic appearance. The ocular diagnosis was retinochoriditis of probably congenital luetic origin and conglomerate tubercles in the choroid. The Roentgen photograph confirmed the diagnosis; while the maternal blood showed weak Wassermann reactions. Twelve days later the patient died and the autopsy showed generalized hematogenous miliary tuberculosis.

Case 2. A six year old girl, was directed to the ear clinic on account of mastoiditis. She had double otorrhea three months before, with much head and ear ache. The pain had started again a few days ago. No vomiting or anorexia. Both drums were perforated and many granulations found in the cavity. No signs of mastoiditis. No distinct result from lumbar fluid examination. Probable diagnosis, otogenous brain abscess. By ophthalmoscopic examination Hoen found the typical picture of miliary choroidal tuberculosis. Operation was given up. Two days later the condition cleared so that the pediatrist doubted the diagnosis. Repeated examination, however, gave the same result. About two weeks later the girl died and the diagnosis was confirmed by autopsy.

Case 3 was one in which miliary tuberculosis was not suspected. A barber 26 years old came to the medical clinic for frontal headache, which had started two months before; and, after temporary improvement, slowly became worse. Internal examination showed little. The patient did not want to enter the hospital and came to the ophthalmic clinic two weeks after he had been referred there. Then miliary tuberculosis of the choroid was diagnosed. A psychiatrist, to whom the patient was recommended, on account of his changed mental attitude, made the diagnosis of melancholia and sent him to a sanitarium, where a neurologist thought to find an empyema, but the roentgenogram of the thorax gave the picture of miliary tuberculosis. Six days later the patient died in coma. The pathologist made the diagnosis of chronic general hematogenous miliary tuberculosis. Slides of tubercles from the choroid were demonstrated.

Discussion. ROCHAT heard with pleasure the demonstration of the great value for the internist of the fundus examination and illustrated this with a recent experience: A patient who walked into the internist's office with a temperature of 40 degrees. At the moment no other sign could be elucidated, but he succumbed a few weeks later with generalized miliary tuberculosis.

Pointolite Lamps and Registration Manometer.

PROF. G. F. ROCHAT replied to queries that the heat was small and no damage to the cornea had been seen.

Discussion. WEVE feared that one could not see, with this lamp, in the cornea, those beautiful light sections seen with the use of a slit as the light source.

Urate Keratitis.

H. WEVE spoke on this subject and demonstrated with pictures the deposits of needle like formations seen by him in the cornea, which he defined as urate crystals.

Discussion. G. VAN HEUVEN asked if the urine metabolism had been investigated. Weve replied that this had not been done, as his consultant did not value this investigation for the diagnosis of gout.

ZEEMAN mentioned that in three patients with corneal affections, two of whom showed the syndrome described by Parinaud, and one similar to Weve's patient, was found an important deviation of the urine metabolism.

HALBERTSMA was reminded of the picture of keratitis of acne rosacea (Peters), and asked if in this case such a condition had existed.

WIBAUT wished to know the result of the treatment.

WEVE did not see signs of rosacea. The crystal deposits were not only in the place of the infiltration, but also in sound tissue. The treatment was rather hopeless, altho the use of hydrochloric acid was followed in the beginning by a period of rest.

ROCHAT asked if Weve really meant that cholesterin crystals are not present during life. In specimens cavities are seen often in tough connective tissue, in which the crystals were located. These cavities must have existed during life and had contents. Besides during life cholesterin crystals are seen with the slit lamp, in the anterior chamber and lens in degenerated eyes.

Lid Margins and Puncta Seen with Slit Lamp.

E. MARX described the findings with the slit lamp. The opening of the tear point shows a double transparent contour, which originates thru the epithelium of the surrounding parts bending over toward the tear point to continue in the epithelial covering. The opening into which one looks becomes smaller inward and forms the infundibulum of Foltz; which, when seen this way, has a paler color. The section of the tear point is round, oval or rectangular, and the long axis lies usually parallel with the lid margin; sometimes, however, perpendicular to it, especially in old people. The size varies in different people and even between the right and left side in one person. Behind the entrance a slit of quite varied dimensions is seen deeper. The walls of the tear canal do not lie against each other.

The epithelium of the lid margin is less transparent than that of the conjunctiva. It is sharply limited from the conjunctival epithelium. In the marginal epithelium the Meibomian gland outlets are visible as round yellow discs surrounded with a transparent border. The hairs are seen to pass in different directions thru the epithelium. Some have little vesicles at the place of implantation. Below the epithelium vessels of different sizes are seen, with their course perpendicular to the longitudinal direction of the lids. Many of these vessels go over into the subcutis of the lids, while they cannot be followed well toward the skin side; around the lacrimal point they sometimes form a ring. This is in general what one sees with 30 diameters enlargement with the slit lamp.

One drop of a 5 per cent aqueous solution of rose bengal, shows microscopically a fine red line where palpebral conjunctiva and lid margin come together. With magnification this line is seen to be formed by numerous very fine superficial red points. This red line is of various widths in different people. The line becomes broader in the neighborhood of the lacrimal puncta and bends about them. The colored points continue partly on the bending margin of the epithelium, where it disappears into the punctum. Numerous exceptions are found to this most common picture. Whatever the connection between punctum and the colored tissue of the division line, a certain number of serried red points can always be found, which form the contact between the two.

In people over fifty years the tear point is seen on a sort of elevation. After the rose bengal staining one sees that the punctum is separated from the red border line; it lies more posteriorly than in young people; the borderline is less sharp and often notched. Scrapings under the microscope show the red points to be epithelial cells. In cases of epiphora the staining will show changes, so if no cause can be

found for the epiphora, one may find that the tearpoint lies outside the borderline.

In a second group of tearing eyes the punctum may lie behind the dividing line; the nearest surroundings of this point may be colored, or very insufficient connection exists between these colored cells and those of the borderline. This is found in older people, often with complaints of wetness of the eyes and slight eversion of the tear point.

The borderline is not straight in conjunctivitis. It shows irregular extensions forward, while the border toward the margin of the eyelid is in many places not sharp. The coloring is often not localized in the cells, but the tissue becomes stained reddish.

A 10 per cent eosin and a 4 per cent water blue and aqueous solution of nigrosin act as rose bengal but less strongly. From the selective action of the stains it is possible to produce a double staining. The conjunctiva can take a blue or violet tint thru methylene blue or gentian violet, which stains the margin only slightly. Rose bengal gives the red color to the margin, which then comes in direct contrast with the blue or red of the rest of the conjunctiva. The stains which have this elective action for the border are acid, altho not all acid stains act in this way. It is possible that the border epithelium cells possess an acid reaction in contradistinction to the cells of the remaining conjunctiva. The acid reaction of the marginal cells of the lid may attract the alkaline tears, to conduct them in the right direction assisted by the winking. Physical causes, as capillary attraction, also play a role. Rose bengal instilled in the conjunctiva of the cadaver stains red the entire conjunctival sac which does not always sharply stop at the lid border.

Discussion. FABER had seen with chronic conjunctivitis and senile ectropion closure of the tear points and asked Marx if he had observed this.

Familial Ptosis with Other Ocular Deviations.

H. J. FLIERINGA showed photographs of a family in Friesland, in which the mother, 2 sons and 3 daughters had congenital ptosis. Motion of the eyeball upward and downward was impossible. In some the internal recti acted poorly, in others it was the external recti. When the eldest son and the youngest daughter tried to look upward, the left globe of the son and the right globe of the daughter turned to the extreme outer angle. Then a strong rotation of the vertical meridian inward took place after which the eyeball could be turned ten to fifteen degrees upward. The speaker considered this motion possible by collaboration of the superior oblique with the external rectus. When the oldest son tried to look downward the left globe went to the inner angle and then a slight rotation downward appeared, probably caused thru contraction of the superior oblique. With all a horizontal and rotary nystagmus with strong latent factor was present; and the ocular axes were directed pretty much downward. The father had normal eyes, also normal musculature. No vestige of this condition was found in father or mother's family.

Discussion. ROCHAT was less pessimistic regarding the treatment. He had performed lately the Panas' operation in 2 sisters and one brother, with good success.

DUBOIS also liked to operate, unless the superior rectus functioned imperfectly.

KRÖNER mentioned the advantages of ptosis spectacles for such patients.

FLIERINGA stated that the head was kept more backward than necessary for the ptosis, because the superior recti functioned so poorly. Therefore small gain could be expected from ptosis operations or ptosis spectacles. He answered Waardenburg that the low position must be attributed to the paresis of the superior rectus, as well as the action of the superior oblique altho, as a rule, contractures are absent with congenital pareses.

Operative Treatment of Divergence after Tenotomy of Interni.

E. FABER reported the history of a case of divergent squint after double tenotomy of the interni. The patient

was now some thirty years old and had a divergent squint of 50 degrees with vision = L. 4/36; R. 1. Total absence of convergence, both sides good excusion outwards, restricted motion towards the nose. Advancement was done. The tendon of the left internus was found adherent to the eyeball a few millimeters behind the normal insertion. The atrophic tendon was sutured to the sclera anterior to the normal attachment. As a divergent strabismus of some 20 degrees remained, operation on the right internus followed. This insertion had receded backward to the equator of the globe. After detaching of this atrophic tendon it was attached to the sclera. Two weeks after the operation the position was parallel; and improved a little with exercises, with the straboscope. Neither good binocular single vision nor convergence was acquired.

The history of a second case was of a twenty year old woman, with a divergent squint of about 40 degrees and very little convergence. The left internus caused a small excursion. Its insertion was found back near the equator. After detachment it was fixed to the sclera in front. Two weeks after the operation the position was nearly parallel while the convergence was good. Faber considered the following points:

The eye most restricted in lateral mobility should be treated first. This will often be the better eye. The stronger the antagonist the greater the effect. Important desiderata are, restoration of the convergence and as much as possible of binocular vision. Regular convergence exercises are necessary before and after the operation. As preparation for the operation strengthening of the weakened ocular muscles is valuable.

Faber pointed out the danger of tenotomies in youth. Strabismus often has its cause in poor fusion. Exercise of this function has a high importance. Unless for excessive deviation, no operative interference before the twelfth year, and then only a temporary, if the angle of deviation is not larger than 10 to 15 degrees convergence. In all other cases an advancement of the muscles with increased function.

Discussion. PIEKEMA supported heartily the speaker's admonition against too early strabismus operation.

DUBOIS does not have Faber's fear for tenotomy in children. If one prescribes spectacles for these children at the age of 3 to 4 years and has them exercise the amblyopic eye until they are 6 years old, when a rather important convergence is present, no objection exists to tenotomy of the internus under proper precautions. If later divergence appears it can be remedied thru advancement of one or both interni (which he combines with tenotomy of the externus). He remembered some four cases, such as Faber had described, operated without great trouble. The appearance of divergent strabismus after tenotomy of the internus remains the exception. However, he is against operation before the seventh year.

ROCHAT wanted to be less dogmatic and more individualistic, not neglecting the psychic disadvantage of the "squinter." If the squint does not disappear, even if glasses are worn for some years, no objection to tenotomy is present even in children of 6 or 8 years.

VAN DER HOEVE considered the squint operation chiefly cosmetic. One should therefore operate on a child at the beginning of school, or about the age of six years. If one takes care that a slight degree of squint remains, and keeps the patient under observation, no great fear need to exist for secondary squint toward the other side. This can be remedied by a second operation; and the time, when no squint was present, has not been bought too dear by the need of a second operation. The awakening and development of the fusion tendency is excellent, but the eyes must have the possibility of using the fusion power, by having brought them into a position where they can bring the double images together. If this succeeds then the fusion tendency is the best preventive against secondary squint.

OPHTHALMIC INSTRUMENTS OF SCIENTIFIC PRECISION.

This Section of the AMERICAN JOURNAL OF OPHTHALMOLOGY is intended primarily to present to the Ophthalmic Public the mechanics and use of the modern accepted instruments of precision. These are to be described and illustrated from a purely impersonal standpoint without clinical claims and apart from all commercial taint. It is the hope of the Editor that any reader who has had especial experience with any particular instrument will offer the benefit of his knowledge. However, the Editor reserves the right to wield a healthy blue pencil in order that the contributions may comform to the aims.

H. S. G.

ELECTRIC OPHTHALMOSCOPES

H. MAXWELL LANGDON, M.D.

PHILADELPHIA.

After Helmholtz's invention of the ophthalmoscope in 1848, all of the modifications and changes had to do with the arrangement of the lenses and mirrors until, in 1885, William Dennett of New York suggested attaching a small lamp to the handle of the instrument, the current being supplied by batteries connected by a cord. The result was the first self illuminated ophthalmoscope. This was not a practical success, owing to mechanical faults in the lamp and batteries then available. They were marketed, however, one devised by Dr. Juler being catalogued for sale by Queen and Company in Philadelphia, as early as 1893. It was similar to the Morton model, with a lamp outside the handle, the small concave mirror being used to deflect the rays into the eye. (Fig. 1).

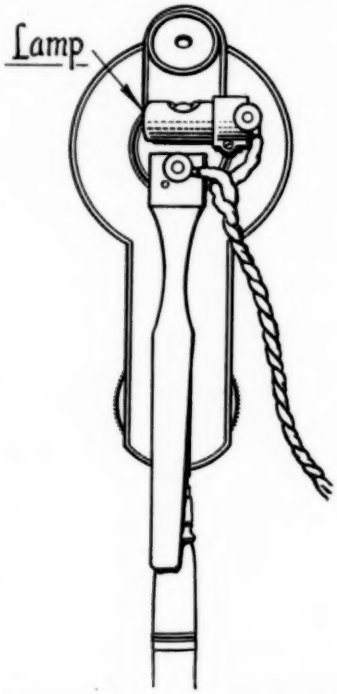

Fig. 1. Diagram of Juler's Electric Ophthalmoscope.

In 1900, a better lamp was obtainable, which did not require as much current as the old carbon ones, and this, with more compact dry cell batteries, made the practical use of a self illuminated ophthalmoscope possible.

Fig. 2. Crampton's battery handle with Morton Ophthalmoscope.

The first one which obtained any wide recognition was made by the De Zeng Company of Philadelphia, the Loring model being used, with a small incandescent lamp in the handle about one inch below the aperture, from which wires ran down the handle and out the end to be connected with batteries.

This was the method of carrying the current to the lamp until 1913; when

Dr. George S. Crampton of Philadelphia suggested that a small dry cell battery be placed in the enlarged handle of the instrument, this now being the usual arrangement. (Fig. 2.)

Some difficulty in avoiding unpleasant reflections from the margin of the aperture was experienced, and several methods have been devised to overcome this—DeZeng by the so

Advances in the construction of self illuminated ophthalmoscopes consisted also in a sliding adjustment in the handle, so that the distance between the light and the mirror may be varied, thus altering the area of the illumination; and recently the addition of a filter screen so that the fundus may be viewed by red free light.

The use of this screen requires a

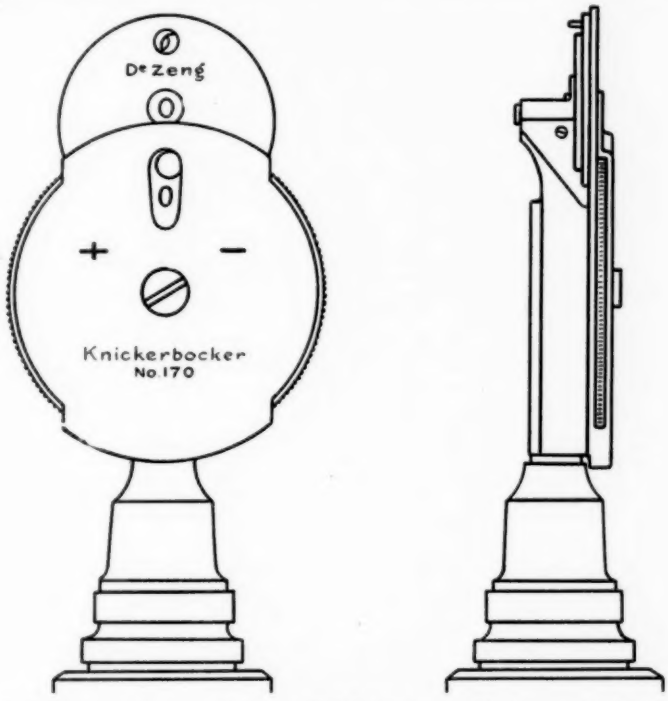

Fig. 3 and 4. DeZeng's arrangement of Loring Ophthalmoscope with battery handle. Fig. 3 back of instrument. Fig. 4. Side view.

called "quill mirror," Marple with his U-shaped mirror, Bausch and Lomb by deflecting the rays to their objective thru a prism, after the suggestion of Dr. C. H. May, instead of deflecting them by a mirror, and the Welch-Allyn instrument, by throwing the light directly into the eye thru a small hemispheric lens on the tip of the lamp. This last method has not been satisfactory. The Marple mirror is quite satisfactory, giving a good illumination without marginal reflections.

The best way to make sure that an instrument has a satisfactory mirror is to turn on the light in a dark room and look thru the aperture: if it is totally dark the mirror is acceptable.

very brilliant light, to be satisfactory; and the self illuminated ophthalmoscope lamps are much too dim for this purpose, except the new DeZeng model. In this, the source of illumination is a 6-volt automobile lamp, operated from the lighting current with interposed resistance. The red filter is a fixed glass type and is sufficiently red free for all practical purposes.

DeZeng has made the Loring model the pattern of most of his models, (Figs. 3 and 4); but also has a very satisfactory one copied after the lines of a Morton instrument with a Marple mirror.

His latest development is a horizontal linear aperture obtained by bisect-

ing the mirror and setting the two halves at different anteroposterior angles, the upper one being more inclined than the lower. (Figs. 5 and 7.)

The resulting illuminated area is sharply defined, and evenly lighted, but unfortunately no alteration in area or amount of light can be made as the lamp is fixed in position, and the rheostat is so made that the current is either completely on or off with no gradation.

Fig. 5. DeZeng's electroscope with horizontal slit double mirror.

The Welch-Allyn instrument, mentioned above, has not been perfectly satisfactory, owing to too much glare, the inevitable result of the lighting arrangement, as well as very disturbing corneal reflexes. (Fig. 6.)

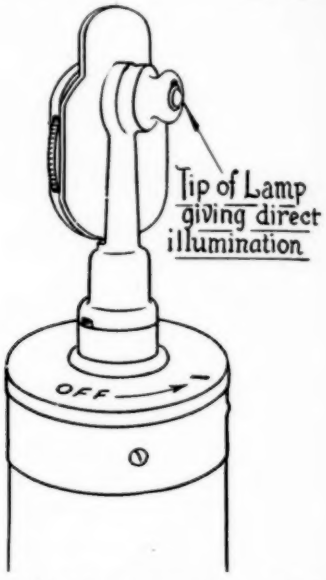

Fig. 6. Welch-Allyn arrangement of electric lamp without mirror. Battery handle.

The Bausch and Lomb Hand Ophthalmoscope (Figs. 8 and 9) has many other elements that make it an extremely practical instrument. The Morton chain of lenses are ground to vertex refraction, and throw with an easy motion. The light, which is sufficient for all but red free ophthalmoscopy, is handled according to the May principle and is broken to enter the eye by a prism. As a result, the corneal reflexes are, to a great extent, abolished.

A reflexless hand ophthalmoscope was devised by Gullstrand some fifteen years ago, and manufactured by Zeiss. It is for indirect ophthalmoscopy only and, altho annoying reflexes are to a great extent eliminated, the

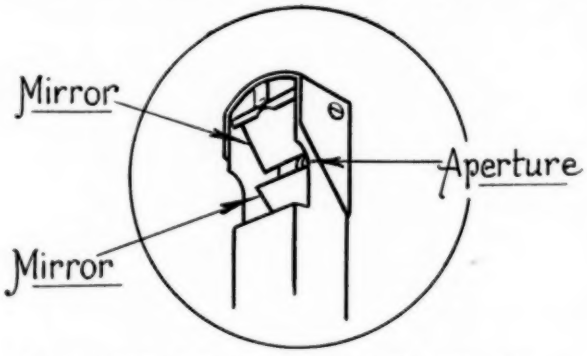

Fig. 7. Detail of DeZeng's horizontal slit double mirror.

apparatus is somewhat too clumsy for routine use. (Figs. 10 and 11.)

By far the greatest advance of recent years is the binocular ophthalmoscope of Gullstrand, first shown at Heidelberg, in 1910. This is a massive instrument that sets upon a table and requires that the patient be fixed in position with a chin and head rest. (Fig. 12.) The light is supplied by a Nitra linear filament lamp, operated from the lighting circuit, with interposed resistance. By a condensing system and a plate glass reflector, the light enters the eye thru one-half of the dilated pupil with a sharp line of

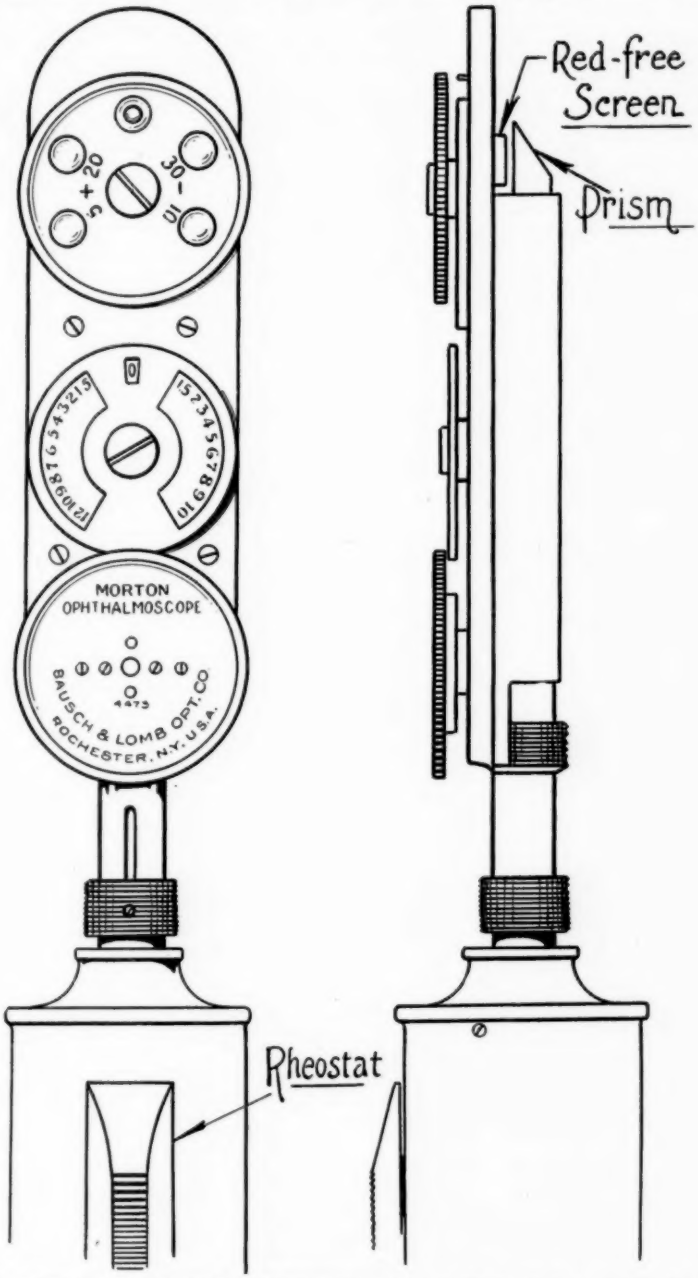

Fig. 8 and 9. Bausch & Lomb hand opthalmoscope. Fig. 8, Back of instrument, showing rheostat. Fig. 9, Section showing arrangement

demarcation. The fundus is viewed thru the horizontal binocular telescope thru the unilluminated half of the pupil, thus completely eliminating all corneal reflexes. The fundus image is magnified ten or twenty diameters, depending upon the oculars used. Inasmuch as the instrument gives a stereoscopic view, the particular advantage is in the study of various levels of the fundus, where tumors, exudations, swellings of the papilla, etc., are present. Furthermore, owing to the telescopic arrangement, the error of refraction of the patient does not produce the disturbance that it does in the simple type of ophthalmoscope and the details of high myopias may be studied with perfect clarity. By replacing the binocular phase of the telescope with a monocular eyepiece with periscope, two observers may view the same fundus at the same time with magnification of from ten to forty diameters.

I wish to express my thanks to Mr. W. L. Wall of Wall and Ochs for assistance and advice in securing illustrations.

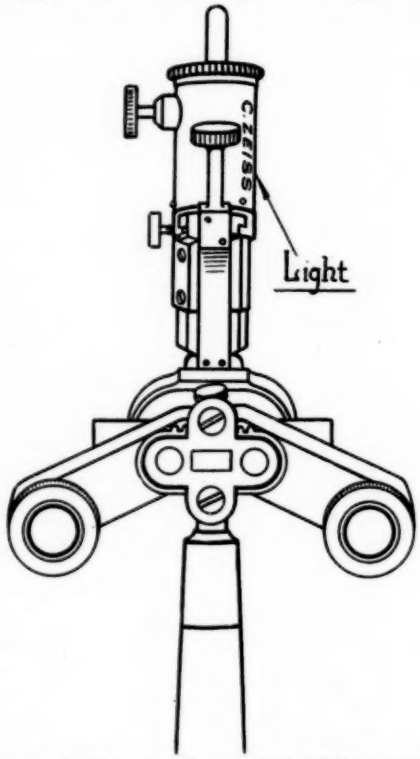

Fig. 10. Gullstrand reflexless hand ophthalmoscope.

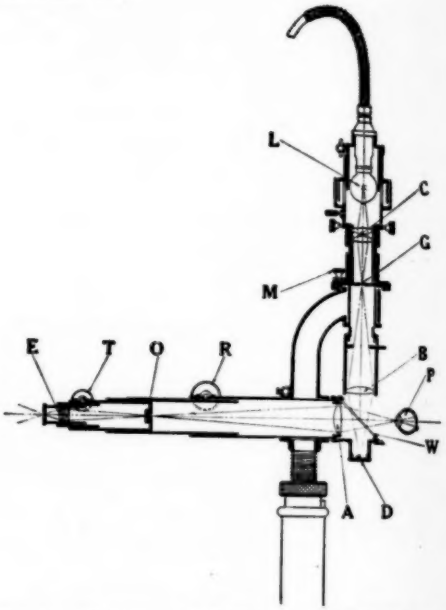

Fig. 12. Diagram of Gullstrand large ophthalmoscope for monocular use. L, electric lamp; C, condensing lens focussing light on split or hole G; B, convex lens to focus light on patient's pupil, P; W, glass plate reflecting light into eye from illuminating apparatus transmitting it to ophthalmoscope lens A. R, focussing apparatus, O diaphragm. T wheel to focus eye piece E.

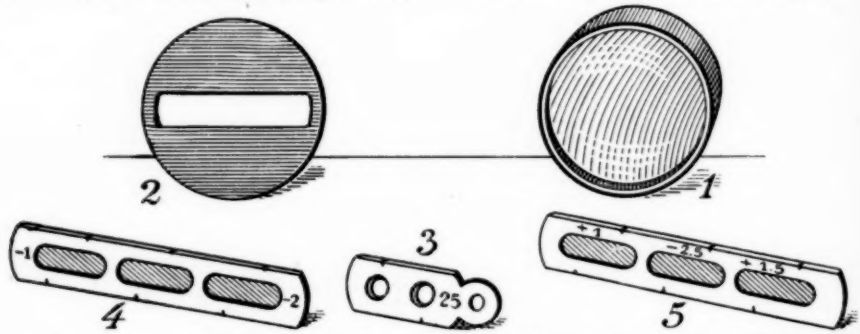

Fig. 11. Accessories of Gullstrand ophthalmoscope. 1, aspheric lens; 2, slit; 3, 4 and 5, slides with lenses.

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THE LONDON CONVENTION.

One is rather bewildered at the thought of giving any satisfactory account of an undertaking of such magnitude as the "Convention of English-speaking Ophthalmological Societies." It was impossible for any one of us to see and hear everything that took place, but a few general impressions may be worth setting down.

There is no question that in all its leading features the Convention was a great success. It was attended very well indeed, the total registration being in the neighborhood of 500. I estimated that about three hundred and fifty were present at the opening session.

Canada and the United States were probably represented by from sixty to eighty members. There was an almost complete absence of representatives from countries other than those of English speech.

The organization of the Convention was quite efficient. The acoustics of the Memorial Hall, in which the general session and the meetings of one of the sections were mostly held, proved somewhat unsatisfactory. But this, not unusual complication, was remedied by the use of Marconi loud speakers. One or two of the talkers, however, showed an amusing, but provoking disposition to turn their backs on the microphone.

The printed material handed to each registrant included a well edited scientific program, with such abstracts as had been handed in by the essayists, and a list of the wonderfully abundant and interesting museum specimens and drawings, which were assembled for this occasion at the University College.

Mr. E. Treacher Collins' presidency of the Convention was delightful and adequate, and a fine blending of dignity, reserve, tact, and a dry but genial humor. Mr. Collins' opening address, on the elimination of eye diseases, welcomed those from overseas to "this great hive of humanity, this London; which, like a malignant neoplasm, had burst its bounds;" and then proceeded to review the fields in which eye diseases had already been largely eliminated, such as leprosy, small-pox, trachoma, and sympathetic ophthalmia. The speaker also referred hopefully to the fact, that the conspiracy of silence concerning syphilis had been broken down, and expressed conviction that "in the battle between the spirochete and man the odds were on man."

The first session of the Convention opened with an address of welcome by

the Right Honorable Neville Chamberlain, M. P., Minister of Health, who spoke of Great Britain's 482 ophthalmic clinics; and was most warmly and persistently applauded when he mentioned Mr. Collins' activities in the organization of the Convention. Mr. Chamberlain was followed by the American ambassador, Mr. Houghton, who read a short address bubbling over with droll humor, in which the old Greek meaning of the word symposium was seized upon for the usual reference to prohibition.

The attendance must have represented thirty or forty national and local ophthalmologic societies in different British possessions and in the United States. It was obviously impossible to give official recognition to all of these, and the organizations singled out for representation in the reception of delegates at the opening meeting were: The American Ophthalmological Society, in the person of Dr. G. E. de Schweinitz; the Section on Ophthalmology of the American Medical Association, by Dr. W. R. Parker; the American Academy of Ophthalmology and Otolaryngology, by Dr. L. M. Francis; the Toronto Academy of Medicine, by Prof. I. M. McCallum; the Montreal Ophthalmological Society, by Prof. W. G. M. Byers; and the Ophthalmological Section of the British Medica Association, New Zealand, by Dr. A. S. Hall.

Prof. S. E. Whitnall was awarded the Nettleship prize, on account of his "monumental work on the anatomy of the organs of vision." Mr. Holmes Spicer then presented the Critchett memorial presidential badge to Mr. Treacher Collins, "as his master, his very kind master, who in that old musty laboratory at Moorfields had taught him all the pathology of the eye he knew."

Such an abundance of papers had been offered that it was necessary, thruout the greater part of the scientific program, to divide the meeting into two sections, which were conducted in halls rather widely separated from one another. This had the disadvantage that it was often impossible to hear the papers which one most desired to hear, because no one could tell when a particular paper in either section would be read. In similar circumstances it might be of very material benefit to establish telephonic communication between the two meeting halls, so that in each of them from time to time announcement could be made of the stage of the proceedings in the other hall.

The papers read presented the usual mingling of distinction and mediocrity. For such a conference it seems of rather doubtful expediency to present material which in almost the same form has been brought before important medical gatherings on several occasions. A more or less international gathering does not, moreover, seem exactly the place at which to put forward reports of cases; which, altho interesting, are not decidedly novel or of outstanding importance.

The "side shows" of the convention included a reception at the Royal College of Surgeons of England, in Lincoln's Inn Fields, by the President, Sir John Bland-Sutton, and Council of the College; visits to institutions of ophthalmic interest, including St. Margaret's Hospital for infantile ophthalmia, the London County Council's myopia school at Sebbon street, Islington, the Royal London Ophthalmic Hospital, St. Dunstan's (the institution for training the war blind, established by the late Sir Arthur Pearson), the Central London Ophthalmic Hospital, the Royal Westminster Ophthalmic Hospital, the National Library for the Blind, the Royal Eye Hospital, the Royal Normal College for the Blind, and the White Oak Ophthalmia School; a reception at the Royal Institution of Great Britain, by Sir James Crichton Browne (in the unavoidable absence of the president, the Duke of Northumberland) and the managers of the Institution; an address (after the reception) at the Royal Institution, by Sir William Bragg, the "atom expert," on "Thomas Young and His Work"; a pleasant garden party, presided over by Sir William and Lady Lister; a reception by the president of the Convention, at the amazing "Wellcome Medical Historical Museum"; a banquet at the Guildhall in the evening of the last day of the scientific sessions; and excursions to the Universities of Oxford and Cambridge.

Unfortunately, some at least of the ex-

cursions to ophthalmic institutions were greatly overcrowded, so that their value was almost completely destroyed. It would seem better, if practicable, to divide such parties into relatively small groups, with a conductor for each group, rather than to risk the confusion associated with the attempt of a hundred people to crowd themselves into one small room after another while the demonstrator offers his explanations.

Sir James Bragg's lecture on "Thomas Young" was a masterpiece of scientific presentation, sufficiently adapted to a relatively uninitiated audience, and was accompanied by a fascinating series of experimental demonstrations. It was given, of course, on the scene of many of the most famous announcements of scientific discovery in Great Britain, on "holy ground," as Mr. Collins phrased it, and in the edifice in which had labored Thomas Young himself, Sir Humphrey Davy, Michael Faraday, John Tyndall, Lord Rayleigh, and Sir James Dewar. In the words of the printed program, "Many of the fundamental ideas upon which is reared the vast fabric of our chemical industries have been worked out within its walls, and also Faraday's epoch making discoveries in electricity."

Special features of the scientific program were a symposium on the evolution of binocular vision, to which Sir Arthur Keith made a most fascinating contribution, and a discussion on the microscopy of the living eye, opened by Gordon Byers, A. J. Bedell, Harrison Butler, and Basil Graves. The members of the Convention also had the opportunity of listening to the Bowman lecture delivered by Sir John Parsons, on "the foundations of vision."

At a business meeting of the Convention, a resolution was proposed by Lucien Howe, and adopted: for creating a committee, one of whose duties is to watch for a favorable opportunity for a really international ophthalmologic congress.

W. H. C.

THE SIGNIFICANCE OF HYPERPHORIA.

When carefully tested for it, many pairs of eyes show slight degrees of hyperphoria. But as all living structure and function simply approach normal types, do not attain the type with mathematical exactness, it is reasonable to assume that the relatively slight deviations of the visual axes from the same plan have only the same significance as the low degrees of hyperopia or astigmatism, that are called normal; or the discrepancies between height and weight, that are recognized as not being departures beyond the limits of health.

The amount of hyperphoria that can be present without passing into vertical squint, is so much smaller than the exophoria or esophoria compatible with lateral fusion—the strength of prism, that can be "overcome" with base up or down, is so much less than the strength that can be overcome with the base out or in—that the limits of the hyperphoria which can be regarded as "normal" are much less than those for exophoria or esophoria. Thus if we let two centrads of exophoria, or four centrads of esophoria pass, as having no pathologic significance, we should allow only one-half centrad of hyperphoria to pass in the same way; altho sometimes double these departures from the perfect standard may cause no trouble.

When hyperphoria is associated with exophoria or esophoria of high degree, however, these limits beyond which it must be regarded as pathologic do not hold. Wide departure of the visual axes from their normal relation, in any direction, must be regarded as more or less of a giving up of the effort to coordinate them. When this occurs, whether behind a Maddox rod or an opaque cover, the relations between the different deviations, above referred to, no longer hold.

It was at one time taught that if hyperphoria was present with exophoria or esophoria, the hyperphoria should always be regarded as the primary fault: and that on correcting the hyperphoria the exophoria or esphoria would disappear, or at least would not cause symptoms of eyestrain. This is true in some cases, but in others it must be recognized that the hyperphoria is not the cause of the lateral

tendency to deviation; and that the latter will not be helped by correction of the former. If with myopia a high exophoria develops, running on presently to divergent squint, there will very often be found a marked vertical deviation also. When binocular vision is rendered impossible, either by covering one eye, or by the change in the shape of the eyeball, the normal proportions of vertical and horizontal adjustment, that can be dealt with by nerve effort, are wholly given up; and 5 centrads of vertical departure from same horizontal plane may mean no more than 5 centrads of horizontal deviation in that plane.

Predominant hyperphoria, that is hyperphoria that must be taken as the more important factor in the causing of symptoms, is to be regarded as an evidence of weakness in one or more of the vertically acting muscles, more often than is exophoria to be taken as evidence of weakness of the interni or esophoria of the externi. If it is suspected that hyperphoria is causing symptoms, the attempt should be made to localize the weakness, by trying the muscle balance with the eyes turned up and turned down, in an effort to fix the location of impaired function in the elevators or the depressors, of one eye or the other. The condition cannot be assumed to be strictly comparable with excess or deficiency of convergance; but as meaning a paresis of some muscle or muscles. It is more often a latent paretic than a latent comitant squint; and must be studied and treated from that point of view.

E. J.

OPHTHALMIC PLASTIC SURGERY.

To a peculiar degree, this is and should be a specialty within a specialty; comparable with bronchoscopy in oto-laryngology, neural surgery among the general surgeons, or the diagnosis of heart disease, or treatment of diabetes among the internists. Perhaps, among all those mentioned, ophthalmic plastic surgery best deserves to be in the hands of few naturally fitted, highly trained, surgeons of extensive experience.

For this work the operator should have a natural aptitude, not only for the delicate manipulation and fine details which belong to all ophthalmic surgery, but also for the planning and visualizing to himself of outlines, relations, modifying forces and probable changes in the tissues directly dealt with, and in the closely related parts. Neither of these natural aptitudes, in high degree, is common among ophthalmologists, or general surgeons. But they are both essential for the highest grade of ophthalmic plastic surgery; and, when possessed, are worthy of most painstaking cultivation and development.

Such a specialist should be an ophthalmologist, entirely accustomed to think in terms of the small dimensions and delicate structures of the eye; perfectly familiar with the normal and pathologic appearances, tendencies, variations and dangers of all the tissues in and about the eye, and the relative importance of different alterations in their functions. Men have attained eminence in this field of work and also in general surgery, but none the less they were thoroly trained ophthalmologists. Such men were the British leaders like Brudenell Carter, Henry Power and John Tweedy. They have all passed away. The late John B. Roberts, who devised a new and important operation for ptosis, always counted himself a general surgeon; and wrote a valuable text book on general surgery and articles on plastic operations on parts other than the eye. But he was trained in ophthalmic practice, and continued to see many cases of ocular disease and defect, thruout his professional life. He had thoro special training in ophthalmology, that general surgeons of this day do not get.

One who does ophthalmic plastic surgery should have seen as many cases as possible, and should have done a great deal of thinking about them. There is very little place for rule-of-thumb work anywhere in ophthalmology, or in general medicine for that matter; but it is rather more out of

place in plastic surgery than anywhere else. No two scars, no two deformities are exactly alike, and success in dealing with them never is attained by following fixed rules. It is only possible by study of the individual case, by measurements, calculations, drawings, tractions and pressure on parts; and by comparing the particular case with others most nearly resembling it, that can be recalled from a large experience, that the wisest course, the most suitable operation can be chosen.

This means, that ophthalmic plastic surgery should be in the hands of a few men, whose minds are continuously working over its problems, whose sense of size and relation as well as sight and touch, are highly developed in this direction. The cases are such that there is always time for reference to the specialist; and the patient is generally willing to make great sacrifices and travel long distances, to secure the benefit of the highest skill. The ophthalmologist, who has not narrowed his work to this particular field, will do best for his patient by referring him to the plastic surgeon, who is thus enabled to gain a large experience with these unusual operations.

Two forms of surgical service, however, every ophthalmologist should hold himself ready to render, since they are demanded rather frequently and in emergencies. These are the accurate coaptation and wise treatment of recent injuries to the eyeball, lids and adjoining parts; and the use of conjunctival flaps, to cover wounds in the globe, or corneal ulcers, that are not doing well. These and some of the operations for the relief of the consequences of trachoma, where trachoma is common, should be familiar to every ophthalmic surgeon. He should also have such a knowledge and understanding of ophthalmic plastic surgery, as will enable him to get an intelligent appreciation of the rarer plastic operations and to give sound advice, as to when and where their benefit should be sought.

E. J.

CHICAGO DINNER MEETING.

The annual dinner and informal meeting of subscribers, contributors, collaborators, editors and stockholders interested in the AMERICAN JOURNAL OF OPHTHALMOLOGY will be held at the Hotel Sherman, Chicago, the evening of October 20th.

This will be the first day of the annual meeting of the American Academy of Ophthamology and Oto-Laryngology which will continue thruout that week. The full announcement with blank for notifying the Secretary of the Ophthalmic Publishing Company, Dr. Charles P. Small, 30 N. Michigan Boulevard, Chicago, will be found in our advertising pages.

BOOK NOTICES.

Newer Methods of Ophthalmic Plastic Surgery, Edmund B. Spaeth, M. D., F. A. C. S., Major, M. C., U. S. A. Chief, Eye Clinic, Walter Reed U. S. Army General Hospital, Washington, D. C. Cloth, 282 pages, 170 illustrations. Philadelphia. P. Blakiston's Son and Co. 1925.

"In this addition to scientific literature, the author has made an important contribution to ophthalmic surgery, and supplied a real ophthalmologic need." This estimate, taken from the "Foreword" written by W. H. Wilmer, Brig. General of the Medical Reserve Corps, U. S. Army, exactly indicates the value and place of this volume in current literature. One further passage from this foreword so forcibly states facts frequently overlooked regarding this branch of surgery, that it is good use of our space to repeat Dr. Wilmer's words.

"No argument is required in order to convince the most casual observer that the destruction of sight is an irreparable catastrophe. But the tragedy that may lie in a distorted physiognomy is not as readily understood. Only one who realizes 'the mind's construction in the face,' can appreciate the profound psychologic effect upon the patient. To reconstruct such a deformity is to reconstruct the man by relieving him of the ever consciousness

of 'one auspicious and one dropping eye,' as Shakespeare expresses it. No rehabilitation is more important or more far reaching in its result."

The World War, in which Major Spaeth got much of his training in plastic surgery, gave an enormous impetus to this refinement of the art of restoring the personal appearance of the individual, when it had been marred and altered by injury or disease. Its "newer methods" are often the only methods to be considered for the restoration sought; and where older methods, these have generally been so modified that they are only to be mastered for present application, thru the most recent descriptions.

While this volume is not put forth as a complete treatise on ophthalmic plastic surgery, as now practiced, the claim that it is such a treatise would be well founded. It is, at least, the nearest approach to such a treatise that has yet appeared. The ground it covers is indicated in the subjects taken up in its eight chapters. 1. General operative technic, anesthesia, instruments, routine operative regime and dressings. 2. Skin grafts, epidermic or bearing hairs for the restoration of lashes, etc., grafts of cartilage, bone, fat, fascia, muscle and mucous membrane. 3. Pedicle flaps, including the tubulated, hammock, sliding and subcuticular flaps. 4. Appliances for pressure; and protheses, supportive, reconstructive and temporary. 5. Ectropion, tarsus extraction, colobomas, lacrimal fistula, ptosis and loss of eyebrows. 6. Canthal operations, lid margins, and palpebral fissure, deformities after enucleation and evisceration of the orbit, and plastic on adjoining parts. 7. Symblepharon, reconstruction of cul-de-sac, lids, socket postoperative deformities, etc. 8. Physiotherapy and medication.

There is an appendix giving a bibliography of nearly 10 pages, which includes with some earlier papers, reference to a large number that have appeared during or since the great war. Rarely has a systematic writer on some recent subject done such full justice to the work of his contemporaries. Among those most frequently credited for papers, illustrations, suggestions, etc., are Beard, Davis, Morax, Wheeler, Axenfeld, Gillies, Roy, Blair, Esser, McKee, Allport, LeMaitre, Snydacker, Cross, Weeks and Wright. The illustrations are largely of diagrams showing methods; and reproduced photographs of cases, all pertinent and helpful. There are a good table of contents, list of illustrations and index—all essential parts of a good reference book.

In his introduction, the author states: "This book was planned for one reason alone, namely to serve the general ophthalmologist in his daily practice." He who does no plastic surgery needs to become thoroly familiar with its contents, in order that he may intelligently advise his ophthalmic patients as to what can be done for the correction of such defects, what may be necessary to accomplish a desired result, how long it will take, what are the risks involved, etc. He who does but few plastic operations will find the book indispensable, for here are the latest descriptions of the best methods of doing these operations. He who does the greatest amount of this kind of ophthalmic surgery, will first and most highly appreciate the peculiar excellences of Major Spaeth's book.

E. J.

The Medical Annual. A Year Book of Treatment and Practitioners Index. By twenty-eight contributors and two associate editors. Forty-third year, 1925. Cloth, 648 pages, 149 illustrations in text, 43 plates, 8 in colors. Bristol: John Wright and Sons, Ltd.

This book contains an enormous accumulation of matters of interest to any practitioner of medicine. Probably in no other publication in the English language can a medical man, with the same amount of reading, keep himself so well in touch with the practical progress of medicine. One who devotes himself to a special branch of professional work is likely to become rusty on other lines of practice, and drop behind in the mastery of many new facts and methods that are continually

coming up, and being recognized as essential parts of medicine as a whole. To have this book and study it, is the best antidote in the world for professional senility or second childhood.

Some idea of the breadth of the field covered and the way it has been subdivided, may be gleaned from the list of topics assigned to the different contributors to this volume. These are: Surgery of the Nervous System. Diseases of the Heart and Blood Vessels. Abdominal Surgery. Anesthesia. Medico-Legal Points of Interest. Surgical Treatment of Pulmonary Tuberculosis. Gynecology and Obstetrics. General Medicine. Orthopedic Surgery. Venereal Diseases. Radioactivity and Electrotherapeutics. Mental Diseases and Psychological Medicine. Gastro-intestinal Disorders. Medical Diseases of Children. Eye Diseases. Skin Diseases. Rectal Surgery. Diabetes. Public Health. Diseases of the Nervous System. Tropical Diseases. Acute Infectious Diseases. Tuberculous Peritonitis. Genito-urinary Surgery. General Surgery. Ear, Nose and Throat Diseases. Diseases of the Respiratory Tract.

Eye Diseases have been assigned to A. E. J. Lister, of Bristol, Lt. Col. I. M. S. (retired), whose different contributions include: Cataract; Cornea, Diseases of; Eye Affections, General; Eye, General Therapeutics of; Eye, Slit Lamp Microscopy of; Glaucoma; Ophthalmology, Preventive; Optic Nerve, Affections of; Refraction, Errors of; and Retina, Diseases of.

The separate sections of the book are arranged alphabetically, so that Mr. Lister's contributions, amounting to 34 pages, are scattered thru half the volume from p. 75 to p. 379. The general difficulty about any alphabetic arrangement is to know the wording of the heading under which a particular subject has been discussed. This difficulty is here met by a very full general index of 28 pages, in which the many double references will quickly steer the student to the topic he is looking for. Of the colored plates, one-half are devoted to the eye.

In addition to the body of the work, which is called a "Dictionary of Practical Medicine, by Many Contributors," there are 20 lists and indexes. Among these are, New Inventions and Preparations, Books for the Year, Establishments for the Treatment of Mental Diseases, Medical and Scientific Societies and Periodicals, etc., etc., that give the work an almost encyclopedic character. The more than two hundred pages of advertisements included with scientific articles, are not without value for reference, for they also are classified and indexed. Nor should the six pages left blank for notes by the owner of the book be regarded as less useful than the 850 printed pages.

For anyone who takes the study and practice of medicine seriously, the "Medical Annual," will prove a most valuable reference book.

E. J.

Catarata Senil. Metodos Operatorios. W. A. Fisher, M. D., F. A. C. S. Translated into Spanish by D. Melchor Parrizas Torres of the Medical Faculty of Barcelona. Paper, 266 pages, 160 illustrations, 112 in color. Barcelona, Spain. Claraso. 1925.

This is the book by Fisher with the collaboration of E. Fuchs, I. Barraquer, Henry Smith, H. T. Holland and J. Westley Wright, published in 1923, and noticed in this Journal, Vol. 6, pp. 611 and 709. So far as we can judge Dr. Torres has faithfully rendered it in Spanish; and since Ignacio Barraquer of Barcelona has written about one-half of the book, it should find a wide circle of readers in Spanish speaking countries. The excellent account of "facoerisis" here given is all the more valuable for the more brief account of other recently proposed cataract operations that accompany it.

E. J.

CORRESPONDENCE.

Trachoma in Egypt.

To the Editor:

On page 498 of the current number of the American Journal of Ophthalmology you state that in the Government Schools of Cairo the trachoma percentage of 85 in 1884 was diminished to 34 in 1900. I think that this

must have been published in one of the old, inaccurate reports, when Eloui Pasha was chief Medical Officer of the Ministry of Education (he has been dead now many years).

In my report on the Ophthalmic State of Egypt for 1922, which the Egyptian Government did not publish, I showed that in Cario at the Husseinieh School, 89.6 per cent of the 728 pupils showed evidence of active or cicatrized trachoma, and at the Mohammed Ali School, of 655 pupils, 96.3 per cent were similarly trachomatous. In Alexandria at the Ras-el-Tin School, out of 785 boys, 74.6 per cent were infected and at the Moharrem Bey School, 75.9 per cent were infected.

Out of 6.816 pupils examined at the Government primary schools thruout Egypt, during the year 1922-3, 90.8 per cent were infected. On the same page you have made a slip, line 12, for 1918, read "1818."

Eason came to Egypt during the war and cannot be considered an authority. There is a very good paper by Meyerhof, in the Annales d'Oculistique, November, 1906, referring to the old Egyptian campaign and blindness. Trachoma itself rarely causes blindness, altho its complications and sequelae do so very frequently. Trachoma is a chronic disease; if acute signs are present in a case which is undoubtedly trachomatous, this is due to infection with some organism productive of acute conjunctivitis.

A. F. MacCallan.

33 Welbeck St., W., London, England.

Ophthalmic Teaching in Paris and Freiburg.

To the Editor:

We visited Dr. Morax at the Hospital Lariboisier the day before we left Paris for our trip south. They were very nice to us. Morax is on service twice each week and has a large clinic. He starts at nine A. M. and works until he is thru. He conducts his own clinic, treats the cases and assigns them to assistants. He has a fine plant. He operates every Thursday morning. There are about a dozen French doctors, who follow him about and watch him treat his cases. He discusses the cases under treatment, but works very rapidly so that they can not be gone into very thoroly for demonstration purposes. All is done in French.

At the present time two courses are given in French, each year: One an operating course covering a period of ten days. The operations are demonstrated first on animal eyes and on the cadaver by the instructor, and then the student does the operation in the same way as it was demonstrated.

In September or October of each year a month's general course is given in French, covering the various branches of ophthalmology. I am enclosing schedules of the same. No other courses are given. One would not get much out of them unless he knew the language.

Dr. Edward Hartmann, one of the assistants, speaks English very well. He said that they would not attempt English courses unless there were classes of ten or more, and then they would only give courses similar to those given in French. The opportunities for graduate study are not as great here as they are in Vienna on this side of the Atlantic, or in America.

In Freiburg, Axenfeld has a splendid plant and an exceedingly well organized clinic. Everything goes off like clock work. Most of the teaching is to undergraduates. No graduate instruction is given excepting to his assistants. If one wanted work there, he would have to master the language and work as assistant in the clinic. Systematized teaching in English has never been attempted. I was much impressed with the volume and character of work that was done there. Axenfeld works in the clinic every morning excepting Sunday.

We did not go to any of the clinics in Switzerland because of the short time that we had there.

W. C. Finnoff.

ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

Terrien, F. Iritis and Glaucoma. Gaz. des Hôp., 1925, v. 98 p. 849-853.

Glaucoma following or complicating iritis occurs in three principal forms: (1) Glaucoma secondary to iritis, (2) Iritis glaucomatosa, and (3) Iritis with predominating glaucomatous symptoms.

In the first form, the symptoms of hypertension predominate. There is a history of former iritis, with occlusion of the pupil, adhesions, iris bombé etc. The treatment consists in paracentesis, iridectomy, sclerectomy, section of the ciliary nerve and, as a last resort, enucleation. Transfixion of the iris has been tried successfully in a few cases.

The second form is that of an iridocyclitis complicated by hypertension. The iritis is of a serous rather than a plastic type, tho the latter may be the form present. In one variety of this disease, the iritic symptoms predominate; in the other, the hypertension. In this disease, it is necessary to use atropin in spite of the increased tension. Miotics sometimes will reduce the tension, but the results are not as favorable as following the use of mydriatics.

In the third form, the iritis may be unnoticed unless sought for, the symptoms of glaucoma predominating. It is possible that almost all congestive glaucomas are in reality cases of iridocyclitis, where the symptoms are hidden by those of glaucoma. The author relates a case where an attack of iridocyclitis followed an iridectomy for acute glaucoma, which attack was cured by the use of atropin. He suggests the use of atropin after sclerectomy and trephining to prevent the precipitates and adhesions which sometimes follow these operations. C. L.

Rentz, W. Treatment of Glaucoma with Suprarenin. Klin. M. f. Augenh., 1924, v. 73, p. 356.

The object of Rentz was to control on 30 patients with 40 glaucomatous eyes the assertions of Hamburger and to determine the value of this treatment during a long period of observation. The 30 cases are described in abstract and the different points claimed by Hamburger are discussed in detail with formulation of the following indications: 1. If in chronic and simple glaucoma the miotics fail, an attempt ought to be made with injections of suprarenin. If they have no effect, an operation must be performed. 2. In acute glaucoma suprarenin is contraindicated. 3. For the noninflammatory forms of secondary glaucoma, the same holds good as for chronic and simple glaucoma. In the inflammatory types, especially recent glaucomatous iritis, suprarenin ought certainly to be tried. C. Z.

Yamanaka, T. Does a Shifting of Pigment Occur in the Human Retinal Epithelium? Autopsy of Case of Oguchi's Disease. Klin. M. f. Augenh., 73, Nov.-Dec., 1924, p. 742, ill.

So far twenty cases of Oguchi's disease in Japan have been reported, none in Europe. It consists in a greyish white discoloration of the fundus, on which the vessels and the macula lutea by contrast appear very dark. Measurements of dark adaptation of a patient aged 31, showed that it remained stationary for from 1½ to 2½ hours, then progressed suddenly. The immediately following ophthalmoscopic examination always revealed the phenomenon of Mizuo, i.e. the fundus looked perfectly normal. The patient died of pulmonary phthisis. Directly before death the eyes were in light adaptation and were examined 4 hours later, showing an abundance of fuscin bodies in the pigment epithelium at the inner side of the nuclei. This makes the epithelial layer opaque and causes the greyish white color of the fundus. A total shifting of the fuscin bodies in dark adaptation renders the epithelial layer more transparent and restores the normal color of the fundus and thus produces the phenomenon of Mizuo. The slowly occurring dark adaptation speaks for an abnormally tardy metabolism in the pigment epithelia and for their inferior development. C. Z.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. George H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph L. McCool, Portland, Oregon: Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

DEATHS.

Dr. Claude A Freligh, Easton, Pennsylvania, aged sixty-two, died June seventh of bronchopneumonia.

Dr. James McElroy Guthrie, Meridian, Mississippi, aged forty-seven, died June sixteenth of heart disease.

Dr William A. Peterson, Chicago, aged fifty-eight, died June twenty-eight, at the Presbyterian Hospital, of pyelonephritis.

Dr. Hugo W. Aufmwasser, Covington, Kentucky (formerly of Denver), member of the American Academy of Ophthalmology and Oto-Laryngoloy, died July 6, aged 55 years.

Dr. Charles Elihu Hackley, Scranton, Pennsylvania, formerly clinical professor of diseases of the eye and ear, Woman's Medical College of the New York Infirmary for Women and Children; for ten years on the staff of the New York Eye and Ear Infirmary; Civil War veteran; aged eighty-nine, died June fifteenth.

SOCIETIES.

The fourth semiannual meeting of the Montana Academy of Oto-Ophthalmology was held in Lewiston on July 7. The guests of honor were Dr W. H. Woodruff, of Joliet and Chicago, Illinois, who presented a paper and moving pictures on the "Tuck, Tenotomy and Transplantation of the Ocular Muscles," and "Deep Iridectomy for Glaucoma"; and Dr. George W Swift, of Seattle, who presented a paper on "Increased Intracranial Pressure." Dr. J. G. Parsons, of Lewiston, presented a paper on "Frontal Sinus Disease," and Dr. Charles F. Coulter, of Great Falls, discussed "Vertigo." It was decided that the fifth annual meeting of the Society be held in Butte, in January, 1926. The Society was entertained by a luncheon and banquet at the Hotel Fergus.

PERSONALS.

Drs. Hans Barkan and Otto Barkan, of San Francisco, announce the removal of their offices to the Medico-Dental building.

Dr. Victor C. Smith has been appointed head of the department of ophthalmology at the new Southern Baptist Hospital, New Orleans.

Dr. Harvey D. Lamb, of St Louis, has been advanced from instructor to assistant professor of ophthalmology at St. Louis University.

Sir John Parsons, of London, has had conferred upon him the honorary degree of Doctor of Science by the University of Bristol.

Dr. L. W. Deichler, Philadelphia, has been appointed visiting ophthalmologist to the Philadelphia General Hospital, to succeed Dr. John W. Croskey, who resigned after twenty-five years' service.

Dr. William F. Brownell, of Fort Collins, Colorado, announces that after June 1st Dr. Lewis Packard will be associated with him. Their practice will be limited to eye, ear, nose and throat.

The daily papers report the capture of Dr. Harvey J. Howard, head of the Ophthalmological Department of the Peking Union Medical College, by Chinese bandits, in Manchuria. He was visiting Mr. Palmer, who was killed by the bandits, while helping to defend a village against their attack. It is supposed that Dr Howard was also assisting in the defense. His son, who accompanied him on the trip, was not taken prisoner.

MISCELLANEOUS.

The trachoma headquarters of the U. S. Public Health Service, which have been located at Louisville, Kentucky, were moved July first to Rolla, Missouri.

An examination was held by the American Board of Otolaryngology on May 26, 1925, at the Medico-Chirurgical Hospital, Philadelphia, with the following result: Passed, 137; failed, 20. Total examined, 157.

The next examination will be held at the University of Illinois School of Medicine on October 19, 1925. Applications may be secured from the Secretary, Dr. H. W. Loeb, 1402 South Grand Boulevard, St. Louis, Missouri.

The Chairman of the Committee on Scientific Research of the American Medical Association, announces a grant of five hundred dollars to Dr. Arthur M. Yudkin, of New Haven, for experimental study of cataract.

Evergreen Hospital, devoted to the rehabilitation of the blind veterans of the World War, closed June first. The last veteran left the institution May twenty-seventh. About half of all the American troops who suffered from eye injuries or impairment of eyesight during the war, were treated at Evergreen.

The St. Louis Eye, Ear, Nose and Throat Infirmary has donated to the St. Louis Medical Society about $3,500 in securities to be known as the St. Louis Eye, Ear, Nose and Throat Infirmary Fund, the income from which is to be used equally to maintain the libraries of the departments of ophthalmology and otolaryngology.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-faced type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is in an abstract of the original article. (Bibl.) mean bibliography and (Dis.) discussion published with a paper.

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Collins, T. and **Mayou, M. S.** Pathology and bacteriology of the eye. Second edition. Cloth, 8 vo., 765 p., 4 col. pl. P. Blakiston's Son and Co., 1925. A. J. O., 1925, v. 8, p. 584-585.

Section on Ophthalmology, American Medical Association. Presession volume. Paper, 8vo., 350 p., 63 ills. Chicago, American Medical Assn. A. J. O., 1925, v. 8, p. 586.

Transactions, American Ophthalmological Society. 1924. Cloth, 8vo., 425 p., 29 pl., 3 in col., 10 ills. in text. Phila. publ. by the Society. A. J. O., 1925, v. 8, p. 585.

Villard, H. Consultations de therapeutique oculaire a l'usage des praticiens. 184 pages, 1925. Paris, Masson et Cie. Clin. Opht., 1925, v. 29, p. 367.

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Ellett, E. C. Optical principles of slitlamp. A. J. O., 1925, v. 8, p. 568.

Pardo, R. Nose piece for objectives of binocular corneal microscope. (1 ill.) Arch. di Ottal., 1925, v. 32, pp. 122-125.

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Jackson, E. Dosage in ocular therapeutics. A. J. O., 1925, v. 8, pp. 581-583.

Metzger. Iodin in ocular diseases. Klin. Woch., 1925, v. 4, p. 1164.

Padovani, S. Bismuth as an antiluetic ocular remedy. Arch. di Ottal., 1925, v. 32, pp. 49-71.

Rotter, F. Adrenalin preparations in ocular practice. Zeit. f. Augenh., 1925, v. 55, pp. 421-423.

Rumbaur. Rivanol in ocular diseases. Münch. med. Woch., 1925, v. 72, p. 1031.

Selter. Milk injections in ocular therapeutics. Paris Thesis, 1925.

Vergne, J. Ocular injuries after instillation of silver nitrate. Soc. Fr. d'Opht., 1925. Ann. d'Ocul., 1925, v. 162, p. 457.

Wildi, G. Cibalbumin in eye diseases. Schweiz. med. Woch., 1925, v. 55, p. 461.

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Lemoine and **Valois.** Anesthesia in ocular surgery. Soc. Fr. d'Opht., 1925. Ann. d'Ocul., 1925, v. 162, p. 482.

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Hayford, J. F. Structure of light. Science, 1925, June 5, p. 583.

Hecht, S. General physiology of vision. Amer. Jour. of Physiol. Optics, 1925, v. 6, pp. 303-322.

Padovani, S. Blind zone of binocular vision. (blind spots superposed by convergence.) (6 ills.) Arch. di Ottal., 1925, v. 32, pp. 125-137.

Sheard, C. Photochemical action and photoreceptors. Amer. Jour. of Physiol. Optics, 1925, v. 6, pp. 380-390.

Venable, W. M. The Quantum theory. (4 tables, 1 ill.) Amer Jour. of Physiol. Optics, 1925, v. 6, pp. 403-415.

Verhoeff, F. H. Theory of binocular perspective. (10 ills.) Amer. Jour. of Physiol. Optics, 1925, v. 6, pp. 416-448.

Wylie, C. C. Daylight visibility of stars from a mine shaft. Science, June 26, 1925, p. 657.

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Barbato, N. Apparatus for skiascopy. (3 ills.) Arch. di Ottal., 1925, v. 32, pp. 108-121.

Duke-Elder-W. S. Changes in refraction in diabetes. B. J. O., 1925, v. 9, pp. 382-383.

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